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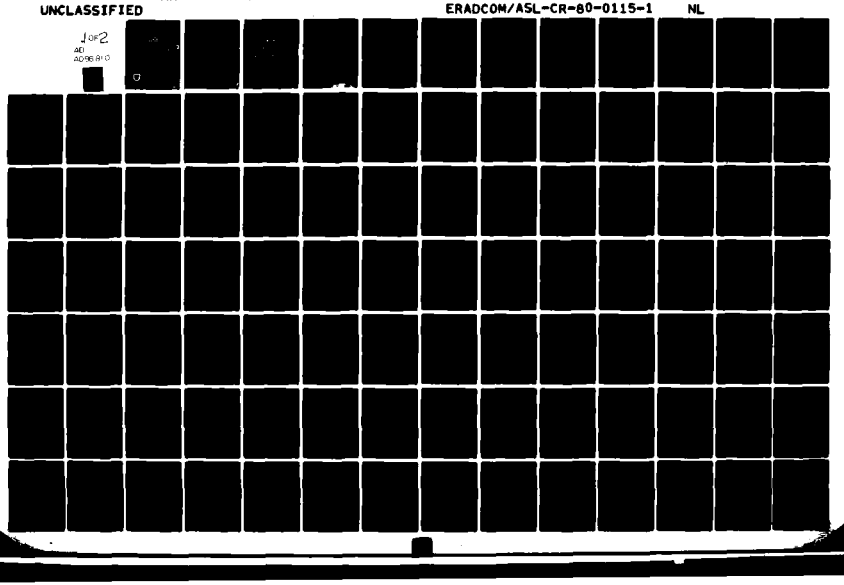

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THE DESCRIPTION OF THE ROBIN PROGRAM AND ITS CONVERSION TO THE INTERDATA 7-32 COMPUTER SYSTEM

LEVEL II

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White Sands Missile Range, NM 88002

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

ROBIN (the operational program for computation of upper atmosphere density and other parameters from a passive inflatable falling sphere) was developed for the Air Force Cambridge Research Laboratory by the University of Dayton Research Institute in the 1960's. Its utilization was limited to the Meteorological Rocket Network ranges that had high precision radars and large capacity computers. The development of minicomputers and the deployment of Nike Hercules tracking radars at several Army meteorological rocket sites made it →over

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20. ABSTRACT (cont)

possible to expand the use of the ROBIN sphere to remote locations. The only remaining barrier was the adaptation of the ROBIN program to a minicomputer. This report describes the conversion of the ROBIN-UNIVAC 1108 program used by the Atmospheric Sciences Laboratory at White Sands Missile Range, New Mexico, to the Interdata 7-32 minicomputer.

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INTRODUCTION

This report describes the results of converting the 1977 ROBIN* program written for the UNIVAC 1108 computer (36 bit) to a ROBIN program written for the Interdata 7/32 computer (32 bit).

In making the conversion, it was necessary to reduce the physical size of the resulting object program and limit the number of input/output units used by ROBIN because of the limited memory of the Interdata computer (128,000 bytes) and limited input/output units (1 magnetic tape unit).

A flow chart for each ROBIN subroutine was made and is included so that any unnecessary calculations or programs could be eliminated. The results of these flow charts indicate that the subroutine LEGNDR, which is a very large program, (35,000 bytes) can be replaced by data statements for the cubic coefficients PXY1(51), PXY2(35), and PZ2(21). These coefficient values are fixed and do not change during the calculations. Since the linear coefficients change during the flight, a new program LINEAR was written to compute the values of PZ1 for points from 19 to 51.

All data in the subroutines DRAGT and ATMOS have been converted from floating numbers (full word) to half word integers. This procedure reduces by about half the size of these two programs.

Comparative results between the 1108 and Interdata ROBIN programs are included for benchmark data taken from an FPS-16 radar track of a sphere. This data is contained on a unilog tape library locator number Y388 at White Sands Missile Range.

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*For a detailed description see references 1 and 2.

I. DESCRIPTION OF PROGRAMS

This section discusses each subroutine and program used by the Interdata system and the UNIVAC 1108 system. Due to the different requirements of the systems some routines are different. The following notation will be observed for all routines:

* Denotes calling argument for the Interdata program

** This program is not used by the Interdata system

*** This program is not used by the 1108 system.

A. ROBIN Program

ATMOS (HI,T,RHOO)

This program is sent an altitude, HI, (meters) and returns Temperature, T, (degree Kelvin) and density, RHOO. These returned data are found by interpolating into data tables corresponding to the 1976 standard atmosphere.

CONTROL (GS,N2MID,KSW2,KSW,IPGE,IY)

Subroutine used to control the calculation of the theoretical trajectory and bias correction values.

CORRS (N,A,M,B,C2,IS)

Subroutine that calculates a correlation value based on the filter coefficients. This constant is used by the subroutine DEV to compute the RMS noise error.

DECALT (JCNT,$,$) - (JCNT,IFLAG1)*

Subroutine reads radar data until there are 5 consecutive decreasing altitudes then selects the next data point corresponding to an even second of time as the initial trajectory point.

DEV (VRHO,VWX,VWY,VP,RHOOO)

Subroutine that calculates the RMS error associated with the winds, pressures, and densities.

DRAGT (CD,AMC,RE,IY,IPGE,$) - (CD,AMC,RE,IFLAG)*

This subroutine is sent a Mach number (AMC), a Reynolds number (RE), from these data a three dimensional table look-up is performed to find the corresponding coefficient of drag (CD).

DRIVE***

Main program used to read unilog tape and writes this data to unit 14 via calls to RTDATA.

DRVT (K,TEMP,RE,AMC,CD,DENTT,HI,LLL)

Subroutine calculates Reynolds number and Mach number based on velocity calculations and temperature and density data from subroutine ATMOS. The drag coefficient is then obtained from subroutine DRAGT.

FITON

Subroutine called by ROBIN and TROBIN to calculate smoothed velocity points by fitting a Legendre polynomial to the raw positional points. Acceleration fits are done

in ROBIN and TROBIN themselves. FITON2 is an entry point within FITON and is used when the number of points for X and Y smoothing is less than the number of points for Z smoothing.

INTER (INTERP,Z2,Z3,IY,IPGE,STALT)

Subroutine that interpolates the one second data calculated by ROBIN for altitude increments of either 200 meters (INTERP ≠ 2) or 1000 meters (INTERP = 2).

LEGNDR (NPTS,MPWR,CF,CFSQ,CF1,CF2,NDER)**

Subroutine called by SINGLE to calculate Legendre polynomial filter coefficients for degrees up to 10 and up to 100 points. For both the January 78 and September 79 ROBIN programs, the cubic coefficients PXY1(51), PXY2(35) and PZ2(21) are fixed. Since these values never change they are stored as data statements in the Interdata program. Since the linear coefficients PZ1 do change they are calculated by subroutine LINEAR in the Interdata program. This approach saves 32,000 bytes of storage.

LINEAR (NPTS)***

Subroutine only used by the Interdata program to calculate the linear filter coefficients PZ1. See description under LEGNDR.

READPT(IX,ICNT,T,S1,S2,S3,$,$)**

Subroutine that returns a single data point of T,X,Y and Z at one tenth second intervals. Program reads data from an array generated by subroutine READ1.

READ1 (IX,D,N,JSTAT)**

Subroutine Reads edited X,Y,Z and T data from unit 15 into a 24 point array.

REAVG (ICNT,$,$) - (ICNT,IFLAG3)*

This subroutine obtains 5 one tenth second data points from READPT and returns the average to the calling program. This program in the Interdata system replaces subroutine READPT and READ1.

REAVGT ($) - (IFLAG4)*

Subroutine reads the theoretical trajectory data from unit 3 and returns a five point average. For the Interdata program the theoretical data is obtained by a call to subroutine THEOT.

ROBIN

Main program controls all subroutines to obtain total ROBIN output. Specific task is to calculate from actual positional radar data, winds, temperature, pressure and density and then add bias correction terms from theoretical trajectory to produce final data output.

RTDATA**

Subroutine reads one data point from the data buffer produced by reading a unilog tape. The actual read is performed by 1108 library subroutine TAPIO.

SINGLE (IDEG1,NPTFT1,CP1,CV1,CA1)**

Subroutine normalizes the filter coefficients generated by subroutine LEGNDR.

SLIDE (IB,ICNT,$,$) - (IB,ICNT,IFLAG5)*

Subroutine shifts the data in the raw data array by one second. That is two data points (oldest time) are shifted out the top and two new data points (most recent time) are shifted into the bottom. New data is obtained from REAVG.

SLIDET (IB,$) - (IB,IFLAG6)**

Subroutine shifts the data in the theoretical raw data array by one second. Two data points are shifted out the top and new data points are shifted into the bottom. New theoretical data is obtained from REAVGT.

TAB (ESALT,IY)

Subroutine prints a table of amplitude ratios for both density and wind.

TABLE**

Subroutine reads from unit 7 the biases generated by the theoretical trajectory and stores these bias terms in a bias array. In the Interdata program the bias terms are placed directly into the bias array as they are calculated by TROBIN.

THEOT

Subroutine calculates a theoretical trajectory based on the starting point apogee of position, velocity and acceleration and falling of the sphere thru the standard atmosphere with zero winds. The differences between the winds, temper-

atures, etc. found by TROBIN, based on the theoretical trajectory, and data from the standard atmosphere tables produce the bias correction terms. The program for the 1108 system writes the trajectory data to unit 3. The program for the Interdata system returns the next calculated point to the calling program.

TIFALL (HI,TFT,IFT,ZVM,HI2,COLAPS,IPGE,IY)

Subroutine makes an inflation check of a sphere based on the time of fall thru the various layers.

TIFAL2 (HI,TFT,IFT,ZVM,HI2,COLAPS,IPGE,IY)

This subroutine makes the same check as in TIFALL except for a sphere of density .115 or .165.

TROBIN (GS,N2MID,KSW2,KSW,IPGE,IY)

Subroutine uses theoretical trajectory data to compute density, temperature, winds, etc. For the 1108 system, trajectory data is read from unit 3 and the results written to unit 7. For the Interdata system, the data is obtained by successive calls to THEOT and the resulting calculations from TROBIN are put directly into the bias arrays.

WANGLE (THETA,WE,WN)

Subroutine uses east wind (WE), and wind (WN) components and returns polar north direction (THETA).

B. Data Editing Program

The subroutines and programs described here are not incorporated into the Interdata program because they would

need to be changed to accommodate data produced by sphere track from a modified Nike Hercules radar. Since the radar has not been modified to track a sphere, nothing has been done to the editing programs except to better document their purpose.

PMR

Main program copies the data tape onto a temporary file and in the process edits out some systematic dropouts. Also prints a list of the data at 1-second intervals.

AØ

Main program calls the editing routines via subroutine MAIN and then calls the main data reduction program ROBIN.

MAIN

Subroutine reads the variables IDCHECK and TSTART, writes them on the output and then calls subroutine MDECK to perform the editing.

MDECK

Subroutine edits data points by discarding those points which do not meet the tolerance requirements. Data thus rejected is replaced by interpolating between good data points.

READST (NT)

Subroutine searches for the first record label on unit NT. Resultant parameters for the record are written to unit 6.

READTT (NT,TI,SI,S2,S3,NA,NCT,NF1,*,*)

Entry point within READST. Reads data from unit 14 until a data point with start time is encountered. Consecutive data points are returned to calling program.

WRTAPE (NA,HT1,HS1,HS2,HS3,M)

Subroutine writes edited data for input to the ROBIN program to unit 15. The individual points are packed into a 96-word record before being written to unit 15.

II. COMPARISON OF INTERDATA AND UNIVAC OUTPUTS

The wind outputs from the Interdata and UNIVAC systems for the benchmark data is compared in Figure 1. This Figure is a graph of the east-west and north-south wind components at 1-kilometer intervals beginning at 98 km and ending at 36 km. Visual comparison of the data shows that the maximum error is 1 m/s in the N-S wind and no difference for the E-W wind.

The pressure, temperature, and density outputs were not compared graphically because of the large dynamic changes that occur in these variables. However, Table 1 contains the actual pressure, temperature and density that was calculated by the two systems at the altitudes indicated.

In comparing pressure, the maximum percentage error was 0.12% which occurred at 81 km. This percentage error is calculated by use of the following equation:

$$\text{percentage error} \doteq \frac{(\text{ABS}(\text{PUNIVAC} - \text{PINTERDATA})) \times 100}{\text{PINTERDATA}} .$$

The nominal error for pressure data calculated for altitudes less than 76 k is less than .06%.

The maximum error in temperature is 1 degree. This 1-degree error occurs because only whole numbers are printed on the output. Internally the error would be approximately the same as for the pressure data. The maximum density percentage error is 0.33% which occurred at 91 km. The nominal error for density data for altitudes less than 83 km is less than .06%.

In all cases the maximum error from Table 1 is due to the fact that output printed did not contain enough significant digits. Using

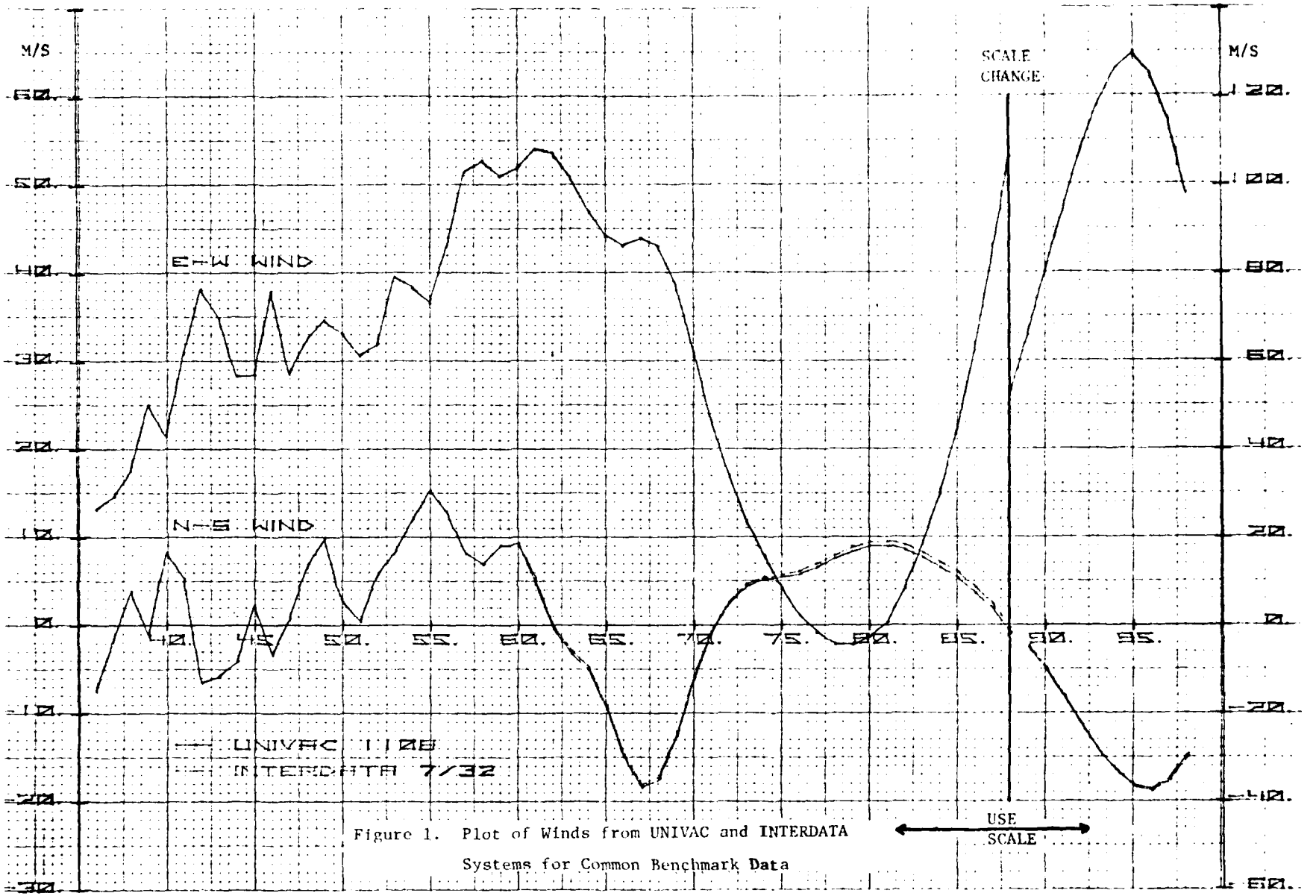


Figure 1. Plot of Winds from UNIVAC and INTERDATA Systems for Common Benchmark Data

Table 1. Pressure, Temperature and Density Comparison of UNIVAC and Interdata Outputs Utilizing Benchmark Input Data.

Altitude (km)	Pressure (MB)		Temperature (Deg K)		Density (G/M^3)	
	Interdata	UNIVAC	Interdata	UNIVAC	Interdata	UNIVAC
98	.00038	.00038	184	184	.00072	.00072
97	.00046	.00046	176	176	.00091	.00091
96	.00056	.00056	170	171	.00114	.00114
95	.00068	.00069	165	166	.00144	.00144
94	.00084	.00084	163	164	.00179	.00179
93	.00103	.00103	164	165	.00218	.00218
92	.00126	.00126	170	171	.00257	.00256
91	.00152	.00152	178	178	.00297	.00296
90	.00182	.00182	186	186	.00340	.00339
89	.00216	.00216	192	193	.00390	.00389
88	.00255	.00255	197	198	.00450	.00449
87	.00302	.00302	201	201	.00523	.00522
86	.00356	.00356	202	202	.00613	.00613
85	.00421	.00421	202	202	.00725	.00724
84	.00497	.00497	199	199	.00867	.00866
83	.00588	.00588	198	198	.01033	.01033
82	.00697	.00696	195	196	.01238	.01238
81	.00827	.00826	192	192	.01496	.01496
80	.00984	.00983	189	189	.01806	.01806
79	.01172	.01171	188	188	.02162	.02162
78	.01396	.01395	189	189	.02571	.02571
77	.01662	.01661	190	190	.03039	.03039
76	.01976	.01976	192	192	.03579	.03579
75	.02347	.02347	195	194	.04193	.04194
74	.02782	.02781	198	198	.04887	.04888
73	.03289	.03290	202	202	.05662	.05664
72	.03874	.03874	206	205	.06549	.06553
71	.04549	.04549	210	210	.07517	.07524
70	.05321	.05323	215	215	.08583	.08594
69	.06199	.06202	220	220	.09776	.09889
68	.07202	.07206	225	225	.11130	.11135
67	.08345	.08350	229	229	.12678	.12675
66	.09629	.09630	239	239	.14030	.14014
65	.11062	.11065	241	241	.15944	.15943
64	.12697	.12702	242	242	.18228	.18224
63	.14573	.14574	245	245	.20676	.20672
62	.16677	.16679	250	250	.23183	.23174
61	.19047	.19048	254	254	.26049	.26045
60	.21634	.21675	254	255	.29480	.29507
59	.24526	.24510	259	259	.32907	.32891
58	.27898	.27881	261	261	.37222	.37204

Table 1. Pressure, Temperature and Density Comparison of UNIVAC and Interdata Outputs Utilizing Benchmark Input Data (Continued).

Altitude (km)	Pressure (MB)		Temperature (Deg K)		Density (G/M^3)	
	Interdata	UNIVAC	Interdata	UNIVAC	Interdata	UNIVAC
57	.31647	.31628	269	269	.40968	.40950
56	.35816	.35795	269	269	.46217	.46191
55	.40574	.40550	267	267	.52765	.52736
54	.46019	.45992	263	263	.60848	.60816
53	.52233	.52203	262	264	.68707	.68666
52	.59285	.59253	265	265	.77830	.77794
51	.67338	.67301	263	263	.89124	.89088
50	.76436	.76394	262	262	1.01524	1.01472
45	1.44703	1.44631	263	263	1.91085	1.90950
40	2.78673	2.78544	248	248	3.90425	3.90476
35	5.52564	5.52335	235	235	8.17073	8.16482
30	11.40067	11.39648	226	226	17.53932	17.51721
25.140	28.56268	28.56044	140	140	70.91200	70.90540

data where 5 (32 bit floating point accuracy) or more digits are printed, the error was less than .06%. Thus, the internal error is less than .06% in all cases.

The total execution time for calculating and printing the total output was 26 minutes. Part of the total output is included from the initial height to an altitude of 50 km.

UNIVERSITY OF DAYTON ROBIN PROGRAM - SEPT 1977

7-32 TEST OF ROBIN BENCHMARK DATA

	XY-VEL	XY-ACC	Z-VEL	Z-ACC
# PTS. FIT	51	35	19	21
DEGREE FIT	3	3	1	3

ID	RD	WR	ALA	GS	RG	HMSL	ZB	AMS	DIA	INT
2377	5	3	32.46	-9.780503	6371229.0	1720.0	0.0	0.1649	1.00000	1

TIME ZULU	ALT METERS	EWIND M/S	NWIND M/S	SPEED M/S	DIR DEG	PRESS MB	T K	DENSITY GR/M3	Z VEL M/S	Z ACC M/S2	TDEN /CC	CF /S	***R.M.S. NOISE ERROR IN*** DENS PRES TEMP EW NN *****PERCENT***** M/S M/S
17.48.20	125302								-300.29	-9.54			
17.48.21	124992								-309.72	-9.50			
17.48.22	124679								-319.13	-9.40			
17.48.23	124364								-327.66	-9.33			
17.48.24	124049								-337.44	-9.27			
17.48.25	123682								-346.50	-9.24			
17.48.26	123369								-355.73	-9.22			
		BALLOON APOGEE : 130 KM.											
17.48.27	122985								-364.86	-9.25			
17.48.28	122619								-374.14	-9.33			
17.48.29	122234								-382.83	-9.43			
17.48.30	121847								-392.74	-9.54			
17.48.31	121451								-402.33	-9.57			
17.48.32	121041								-412.25	-9.54			
17.48.33	120640								-421.79	-9.47			
17.48.34	120208								-431.64	-9.42			
17.48.35	119775								-440.69	-9.36			
17.48.36	119319								-450.58	-9.32			
17.48.37	118873								-460.23	-9.28			
17.48.38	118411								-468.80	-9.27			
17.48.39	117956								-477.42	-9.28			
17.48.40	117463								-485.51	-9.33			
17.48.41	116978								-495.28	-9.36			
17.48.42	116491								-505.20	-9.39			
17.48.43	115964								-515.50	-9.41			
17.48.44	115461								-525.15	-9.44			
17.48.45	114923								-534.53	-9.45			
17.48.46	114375								-544.02	-9.47			
17.48.47	113830								-553.28	-9.44			
17.48.48	113284								-562.54	-9.37			
17.48.49	112718								-571.29	-9.28			
17.48.50	112150								-579.92	-9.19			
17.48.51	111558								-589.90	-9.13			
17.48.52	110973								-599.26	-9.11			
17.48.53	110374								-608.72	-9.12			
17.48.54	109759								-617.96	-9.12			
17.48.55	109141								-626.66	-9.13			
17.48.56	108508								-635.56	-9.14			
17.48.57	107880								-644.89	-9.14			
17.48.58	107227								-653.25	-9.11			
17.48.59	106585								-662.32	-9.05			

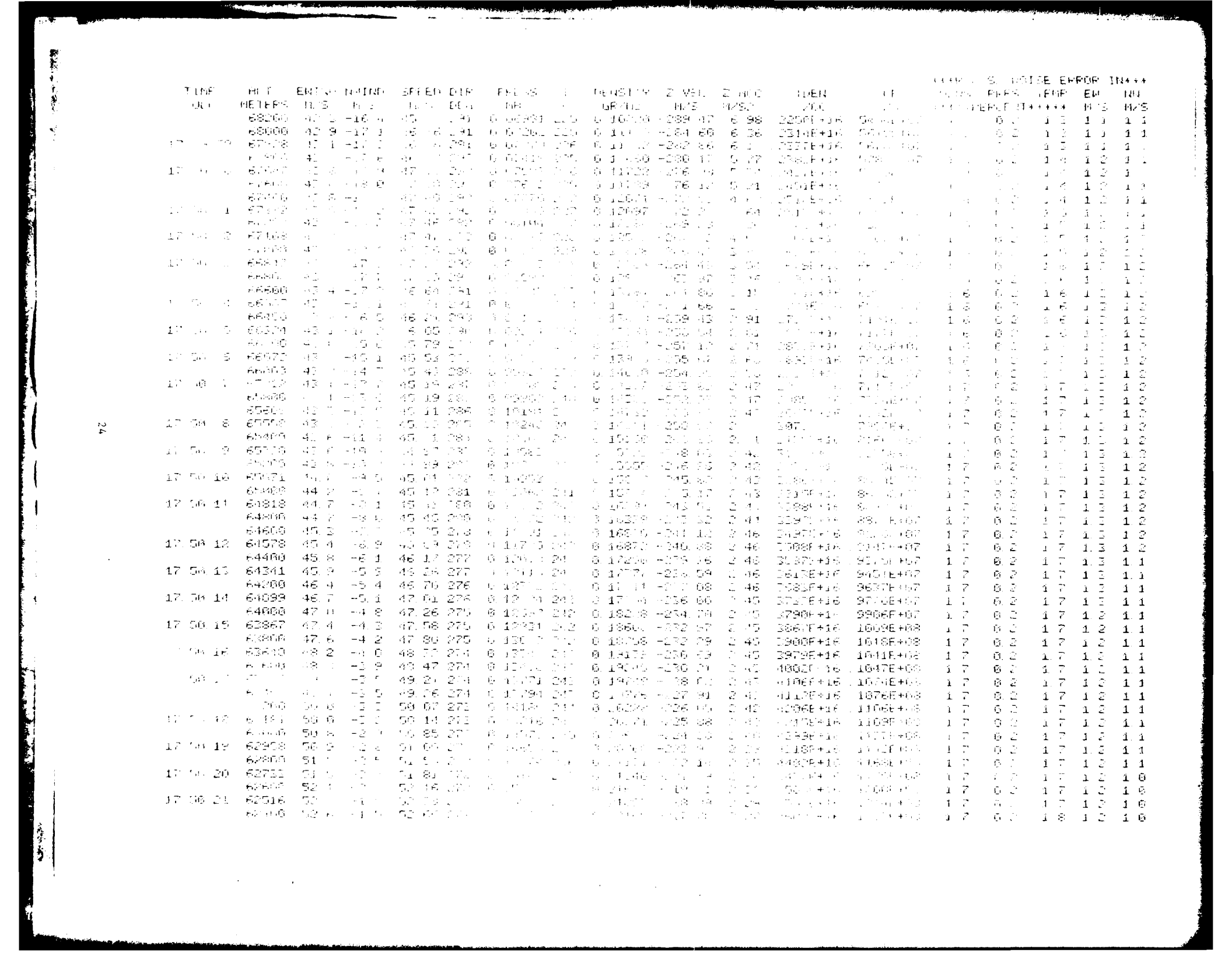
TIME ZULU	ALT METERS	EWIND M/S	NWIND M/S	SPEED M/S	DIR DEG	PRESS MB	T K	DENSITY GR/M3	Z VEL M/S	Z ACC M/S2	TDEN /CC	CF /S	DENS (***R M S NOISE ERROR IN*** *****PERCENT*****)	PRES	TEMP	EW M/S	NW M/S
17 49 0	105912								-671.74	-8.99							
17 49 1	105[illegible]								-681.37	-8.98							
17 49 2	104551								-690.48	-8.97							
17 49 3	10[illegible]856								-699.37	-8.95							
17 49 4	10[illegible]142								-708.25	-8.91							
17 49 5	102440								-716.47	-8.84							
17 49 6	101728								-725.26	-8.76							
17 49 7	101014								-733.25	-8.62							
17 49 8	100[illegible]3								-741.97	-8.45							
17 49 9	99[illegible]25								-751.01	-8.25							
17 49 10	98772	[illegible]	-21.1	84.48	284	0.000[illegible]	197	0.00060	-7[illegible]9.77	-8.01	.122[illegible]E+14	.25[illegible]E+05	9.6	0.6	9.[illegible]	23.6	32.9
	98600	85.4	-22.1	8[illegible].47	28[illegible]	0.00074	191	0.00062	-761.5[illegible]	-7.95	.1796E+14	.2664E+05	9.3	0.8	9.3	22.0	31.9
	98400	8[illegible].5	-25.4	93.[illegible]	28[illegible]	0.000[illegible]5	188	0.000[illegible]	-763.60	-7.88	.17[illegible]E+14	.2764E+05	9.0	0.9	9.0	22.2	30.7
	98200	93.[illegible]	-27.7	97.70	286	0.000[illegible]7	186	0.00068	-765.66	-7.81	.1[illegible]E+14	.2864E+05	8.6	1.1	8.7	21.4	29.6
17 49 11	98009	97.[illegible]	-29.9	102.17	287	0.000[illegible]	185	0.00072	-767.62	-7.74	.149[illegible]E+14	.2960E+05	8.7	1.2	8.4	20.7	28.5
	98000	97.8	-29.9	102.27	287	0.000[illegible]	184	0.00072	-767.70	-7.74	.1492E+14	.29[illegible]6E+05	8.3	1.2	8.4	20.7	28.5
	97800	10[illegible].5	-31.1	106.11	287	0.000[illegible]	182	0.00075	-769.5[illegible]	-7.65	.1571E+14	.3086E+05	8.0	1.3	8.1	20.0	27.5
	97600	105.1	-3[illegible]	109.85	287	0.000[illegible]	18[illegible]	0.00079	-771.44	-7.57	.1650E+14	.3207E+05	7.7	1.4	7.9	19.4	26.6
	97400	108.8	-3[illegible]	1[illegible]3.79	287	[illegible]	1[illegible]	0.00083	-773.30	-7.49	.1728E+14	.3327E+05	7.4	1.4	7.6	18.8	25.7
17 49 12	97[illegible]	112.0	-3[illegible].4	117.18	287	0.000[illegible]	17[illegible]	0.00086	-774.96	-7.41	.1797E+14	.3434E+05	7.2	1.5	7.3	18.2	24.8
	9[illegible]200	11[illegible]	-3[illegible].5	117.[illegible]	287	0.000[illegible]	177	0.00087	-775.17	-7.40	.1807E+14	.3450E+05	7.2	1.5	7.3	18.2	24.7
	97000	114.[illegible]	-3[illegible]	119.[illegible]	287	0.000[illegible]6	176	0.00091	-77[illegible].03	-7.31	.1895E+14	.3593E+05	6.9	1.5	7.1	17.6	23.9
	96800	117.1	[illegible]	12[illegible]	287	[illegible]	1[illegible]	0.00095	-778.89	-7.22	.1983E+14	.3736E+05	6.7	1.5	6.9	17.0	23.1
	96600	119.[illegible]	-3[illegible]	1[illegible]	287	[illegible]	[illegible]	0.00099	-78[illegible].75	-7.1[illegible]	.2070E+14	.3879E+05	6.4	1.6	6.6	16.5	22.2
17 49 13	9645[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.001[illegible]	-782.11	-7.05	.2135E+14	.3983E+05	6.3	1.6	6.5	16.0	21.6
	96400	121.[illegible]	[illegible]	1[illegible]	[illegible]	0.000[illegible]	[illegible]	0.00104	-782.5[illegible]	-7.02	.2154E+14	.4029E+05	6.2	1.6	6.4	15.9	21.4
	96200	12[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00[illegible]	-784.[illegible]	-6.91	.[illegible]275E+14	.4199E+05	6.0	1.6	6.2	15.4	20.7
	96000	12[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0011[illegible]	-786.0[illegible]	-6.79	.[illegible]16E+14	.4370E+05	5.7	1.6	6.0	15.0	20.0
	95800	12[illegible]	[illegible]	171.[illegible]	[illegible]	[illegible]	[illegible]	0.001[illegible]	-787.8[illegible]	-6.6[illegible]	.[illegible]E+14	.4540E+05	5.5	1.6	5.7	14.5	19.3
17 49 14	9567[illegible]	127.[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	0.001[illegible]	-7[illegible].97	-6.61	.25[illegible]E+14	.4[illegible]E+05	5.4	1.6	5.6	14.[illegible]	18.9
	95600	12[illegible]	-[illegible].6	1[illegible]	[illegible]	[illegible]	167	0.00126	-789.5[illegible]	-6.56	.2614E+14	.4724E+05	5.3	1.6	5.5	14.0	18.7
	95400	12[illegible].2	-27.3	[illegible].51	[illegible]	[illegible]	[illegible]	0.00131	-791.03	-6.42	.2743E+14	.4929E+05	5.1	1.6	5.4	13.6	18.1
	95200	128.[illegible]	-30.0	1[illegible]	2[illegible]6	0.000[illegible]	[illegible]	0.001[illegible]	-792.54	-6.29	.2871E+14	.[illegible]34E+05	4.9	1.6	5.2	13.2	17.5
	95000	129.5	-2[illegible].7	1[illegible].57	285	0.000[illegible]	165	0.001[illegible]	-794.06	-6.15	.2999E+14	.5[illegible]E+05	4.7	1.5	5.0	12.7	16.9
17 49 15	94879	1[illegible]9.9	-2[illegible]	1[illegible]1.83	28[illegible]	[illegible]	165	0.001[illegible]9	-794.97	-6.07	.3077E+14	.5463E+05	4.6	1.5	4.9	12.5	16.5
	94800	129.[illegible]	-2[illegible]	1[illegible].48	285	0.000[illegible]1	16[illegible]	0.001[illegible]	-795.4[illegible]	-6.01	.3135E+14	.5[illegible]60E+05	4.6	1.5	4.8	12.3	16.3
	94600	128.[illegible]	-3[illegible].4	1[illegible].46	2[illegible]5	0.000[illegible]	16[illegible]	0.00157	-796.7[illegible]	-5.87	.3281E+14	.5805E+05	4.4	1.5	4.7	12.0	15.8
	94400	1[illegible]7.8	-34.7	1[illegible].41	285	0.00077	163	0.00164	-798.09	-5.72	.3427E+14	.6050E+05	4.2	1.5	4.5	11.6	15.3
	94200	1[illegible]7.0	-3[illegible].9	1[illegible].41	284	0.000[illegible]	16[illegible]	0.00172	-799.39	-5.57	.3573E+14	.6295E+05	4.1	1.5	4.3	11.2	14.7
17 49 16	94083	126.5	-3[illegible].5	1[illegible]0.8[illegible]	284	0.00080	163	0.00176	-800.14	-5.48	.3659E+14	.6438E+05	4.0	1.5	4.3	11.0	14.4
	94000	125.8	-3[illegible]	[illegible].12	284	0.000[illegible]	163	0.00179	-800.75	-5.41	.3726E+14	.6557E+05	3.9	1.4	4.2	10.9	14.2
	93800	124.[illegible]	-32.4	1[illegible].46	284	0.000[illegible]7	163	0.00186	-802.19	-5.24	.3888E+14	.6844E+05	3.8	1.4	4.1	10.6	13.8
	93600	122.8	-31.6	1[illegible]6.79	2[illegible]4	0.000[illegible]1	163	0.00194	-803.6[illegible]	-5.08	.4050E+14	.7130E+05	3.7	1.4	3.9	10.2	13.3
	93400	121.2	-30.9	125.17	284	0.00095	163	0.00202	-805.07	-4.91	.4212E+14	.7417E+05	3.5	1.4	3.8	9.9	12.9
17 49 17	9327[illegible]	120.3	-30.[illegible]	124.10	284	0.00097	164	0.00207	-805.96	-4.81	.4312E+14	.7593E+05	3.5	1.4	3.7	9.7	12.6
	93200	119.6	-30.0	12[illegible].28	28[illegible]	0.00099	16[illegible]	0.00210	-806.37	-4.74	.4376E+14	.7721E+05	3.4	1.3	3.7	9.6	12.5
	93000	117.7	-28.7	121.15	[illegible]	0.0010[illegible]	164	0.00218	-807.43	-4.57	.4541E+14	.8054E+05	3.3	1.3	3.6	9.3	12.1
	92800	115.8	-27.5	119.03	281	0.001[illegible]7	165	0.00226	-80[illegible].49	-4.46	.4707E+14	.8387E+05	3.2	1.3	3.5	9.0	11.7
	92600	113.9	-26.3	116.91	28[illegible]	0.00112	166	0.00234	-809.5[illegible]	-4.2[illegible]	.4873E+14	.8719E+05	3.1	1.3	3.4	8.7	11.3
17 49 18	92480	112.8	-25.5	115.6[illegible]	28[illegible]	0.00114	167	0.00239	-810.18	-4.1[illegible]	.4971E+14	.8918E+05	3.1	1.3	3.3	8.6	11.0
	92400	111.8	-25.0	11[illegible].57	[illegible]	0.00116	167	0.00242	-810.60	-4.06	.5034E+14	.9069E+05	3.0	1.2	3.3	8.5	10.9
	92200	109.4	-23.8	111.90	28[illegible]	0.00121	168	0.00249	-811.67	-3.89	.5190E+14	.9445E+05	2.9	1.2	3.2	8.2	10.6
	92000	106.9	-22.5	109.26	28[illegible]	0.00126	170	0.00257	-812.66	-3.72	.5346E+14	.9821E+05	2.9	1.2	3.1	8.0	10.2

TIME ZULU	ALT METERS	EWIND M/S	NWIND M/S	SPEED M/S	DIR DEG	PRESS MB	T K	DENSITY GR/M3	Z VEL M/S	Z ACC M/S2	THEN /CC	CF /S	DENS	PRES	TEMP	EW M/S	NW M/S
													***R M S	NOISE	ERROR IN***		
													*****PERCENT*****				
	91800	101.[illegible]	-21.2	106.60	28[illegible]	0.0011[illegible]	171	0.00264	-812.70	-3.5[illegible]	.5507E+14	.1020E+06	2.8	1.2	3.0	7.7	9.9
17 49 19	91661	102.8	-20.4	104.76	281	0.001[illegible]	173	0.00270	-811.41	-3.43	.5610E+14	.1046E+06	2.7	1.1	3.0	7.6	9.6
	91600	101.4	-20.0	102.87	281	0.00136	171	0.00272	-814.68	-3.38	.5662E+14	.1059E+06	2.7	1.1	2.9	7.5	9.6
	91400	99.1	-18.6	100.81	28[illegible]	0.001[illegible]	17[illegible]	0.00280	-815.55	-3.19	.5820E+14	.1101E+06	2.6	1.1	2.9	7.3	9.3
	91200	96.3	-17.2	97.78	280	0.00146	176	0.00288	-816.40	-3.00	.6001E+14	.1143E+06	2.6	1.1	2.8	7.0	9.0
	91000	93.1	-15.9	94.75	27[illegible]	0.00152	178	0.00297	-817.29	-2.81	.6171E+14	.1185E+06	2.5	1.1	2.7	6.8	8.7
17 49 20	90854	91.3	-14.9	92.54	279	0.00156	179	0.00302	-817.93	-2.68	.6294E+14	.1216E+06	2.4	1.0	2.7	6.7	8.4
	90800	90.6	-14.5	91.76	279	0.00157	179	0.00305	-818.09	-2.63	.6343E+14	.1229E+06	2.4	1.0	2.6	6.6	8.4
	90600	87.9	-13.[illegible]	88.90	27[illegible]	0.0016[illegible]	181	0.00313	-818.69	-2.42	.6525E+14	.1276E+06	2.4	1.0	2.6	6.4	8.1
	90400	85.3	-12.1	86.60	278	0.00169	182	0.00322	-819.28	-2.24	.6706E+14	.1323E+06	2.3	1.0	2.5	6.2	7.9
	90200	82.4	-10.9	83.1[illegible]	277	0.00175	18[illegible]	0.00331	-819.88	-2.04	.6888E+14	.1370E+06	2.2	1.0	2.5	6.1	7.6
17 49 21	90025	80.1	-9.[illegible]	80.67	27[illegible]	0.00181	186	0.00339	-820.40	-1.88	.7046E+14	.1410E+06	2.2	1.0	2.4	5.9	7.4
	90000	79.[illegible]	-9.7	80.29	276	0.00182	186	0.00340	-820.44	-1.85	.7072E+14	.1417E+06	2.2	1.0	2.4	5.9	7.4
	89800	76.[illegible]	-8.6	77.1[illegible]	276	0.00188	187	0.00350	-820.72	-1.64	.7276E+14	.1470E+06	2.1	0.9	2.3	5.7	7.1
	89600	73.9	-7.5	74.[illegible]	275	0.00195	188	0.00359	-821.01	-1.43	.7479E+14	.1522E+06	2.1	0.9	2.3	5.5	6.9
	89400	71.[illegible]	-6.4	71.[illegible]3	27[illegible]	0.00202	190	0.00369	-821.29	-1.22	.7683E+14	.1575E+06	2.0	0.9	2.2	5.4	6.7
17 49 22	89213	68.3	-5.4	68.55	274	0.0020[illegible]	19[illegible]	0.00379	-821.55	-1.03	.7872E+14	.1624E+06	2.0	0.9	2.2	5.2	6.5
	89200	68.[illegible]	-5.[illegible]	68.37	274	0.00209	191	0.00379	-821.54	-1.01	.7888E+14	.1628E+06	2.0	0.9	2.2	5.2	6.5
	89000	65.[illegible]	-4.5	65.71	27[illegible]	0.00216	19[illegible]	0.00390	-821.38	-0.79	.8120E+14	.1687E+06	1.9	0.9	2.1	5.1	6.3
	88800	63.[illegible]	-3.[illegible]	63.09	273	0.00223	192	0.00401	-821.21	-0.57	.8350E+14	.1746E+06	1.9	0.8	2.1	4.9	6.1
	88600	60.[illegible]	-2.[illegible]	60.45	272	0.00231	[illegible]	0.00412	-821.04	-0.35	.8584E+14	.1805E+06	1.9	0.8	2.0	4.8	5.9
	88400	57.8	-1.[illegible]	57.8[illegible]	27[illegible]	0.00239	[illegible]	0.00424	-820.88	-0.13	.8815E+14	.1864E+06	1.8	0.8	2.0	4.6	5.7
17 49 23	88381	57.5	-1.7	57.57	271	0.00240	19[illegible]	0.00425	-820.86	-0.11	.8837E+14	.1869E+06	1.8	0.8	2.0	4.6	5.7
	88200	55.4	-1.1	55.[illegible]	271	0.00247	197	0.00437	-820.74	0.11	.9087E+14	.1930E+06	1.8	0.8	1.9	4.5	5.5
	88000	52.6	-0.4	52.97	270	0.00255	19[illegible]	0.00450	-820.61	0.36	.9362E+14	.1997E+06	1.7	0.8	1.9	4.4	5.4
	87800	50.5	0.2	50.56	269	0.00264	19[illegible]	0.00463	-820.47	0.61	.9638E+14	.2064E+06	1.7	0.7	1.8	4.2	5.2
	87600	48.1	0.9	48.15	268	0.00273	199	0.00477	-820.34	0.86	.9913E+14	.2131E+06	1.6	0.7	1.8	4.1	5.0
17 49 24	87570	47.8	1.0	47.79	268	0.00275	200	0.00479	-820.32	0.90	.9955E+14	.2141E+06	1.6	0.7	1.8	4.1	5.0
	87400	45.9	1.4	45.95	268	0.00282	200	0.00491	-819.98	1.14	.1023E+15	.2206E+06	1.6	0.7	1.8	4.0	4.9
	87200	43.7	1.9	43.79	267	0.00292	200	0.00507	-819.59	1.42	.1056E+15	.2283E+06	1.6	0.7	1.7	3.9	4.7
	87000	41.5	2.4	41.62	266	0.00302	201	0.00523	-819.19	1.70	.1088E+15	.2360E+06	1.5	0.7	1.7	3.8	4.6
	86800	39.3	2.9	39.46	265	0.00312	201	0.00539	-818.79	1.98	.1121E+15	.2436E+06	1.5	0.7	1.6	3.7	4.5
17 49 25	86737	38.7	3.0	38.78	265	0.00315	202	0.00544	-818.67	2.06	.1131E+15	.2460E+06	1.5	0.7	1.6	3.6	4.4
	86600	37.2	3.3	37.46	264	0.00323	201	0.00556	-818.26	2.29	.1158E+15	.2520E+06	1.5	0.7	1.6	3.6	4.3
	86400	35.[illegible]	3.6	35.[illegible]8	264	0.00334	202	0.00575	-817.66	2.61	.1198E+15	.2607E+06	1.4	0.6	1.6	3.5	4.2
	86200	33.1	3.9	33.37	263	0.00345	202	0.00594	-817.06	2.94	.1237E+15	.2695E+06	1.4	0.6	1.5	3.4	4.1
	86000	31.1	4.3	31.35	262	0.00356	202	0.00613	-816.45	3.26	.1276E+15	.2782E+06	1.4	0.6	1.5	3.3	3.9
17 49 26	85927	30.3	4.4	30.62	261	0.00361	202	0.00621	-816.24	3.38	.1291E+15	.2813E+06	1.3	0.6	1.5	3.3	3.9
	85800	29.2	4.6	29.54	260	0.00368	202	0.00634	-815.73	3.61	.1320E+15	.2877E+06	1.3	0.6	1.5	3.2	3.8
	85600	27.4	5.0	27.85	259	0.00381	202	0.00655	-814.94	3.97	.1365E+15	.2977E+06	1.3	0.6	1.4	3.1	3.7
	85400	25.6	5.3	26.15	258	0.00394	202	0.00677	-814.15	4.33	.1411E+15	.3077E+06	1.3	0.6	1.4	3.0	3.6
	85200	23.8	5.7	24.45	256	0.00407	202	0.00700	-813.35	4.69	.1456E+15	.3176E+06	1.2	0.6	1.4	3.0	3.5
17 49 27	85118	23.0	5.8	23.76	255	0.00412	202	0.00709	-813.03	4.84	.1475E+15	.3217E+06	1.2	0.6	1.3	2.9	3.5
	85000	22.1	6.0	22.93	254	0.00421	202	0.00725	-812.27	5.09	.1509E+15	.3285E+06	1.2	0.6	1.3	2.9	3.4
	84800	20.6	6.2	21.5[illegible]	25[illegible]	0.00435	201	0.00751	-810.98	5.48	.1566E+15	.3400E+06	1.2	0.5	1.3	2.8	3.3
	84600	19.6	6.4	20.12	251	0.00450	201	0.00778	-809.69	5.89	.1622E+15	.3515E+06	1.1	0.5	1.3	2.7	3.2
	84400	17.5	6.6	18.[illegible]	[illegible]	0.00465	200	0.00807	-808.41	6.29	.1679E+15	.3630E+06	1.1	0.5	1.2	2.7	3.1
17 49 28	84301	16.7	6.[illegible]	18.0[illegible]	[illegible]	0.00472	200	0.00821	-807.77	6.49	.1707E+15	.3687E+06	1.1	0.5	1.2	2.6	3.1
	84200	16.1	6.9	17.5[illegible]	[illegible]	0.00481	200	0.00836	-806.90	6.72	.1741E+15	.3754E+06	1.1	0.5	1.2	2.6	3.0
	84000	14.7	7.1	16.46	244	0.00497	199	0.00867	-805.18	7.17	.1806E+15	.3886E+06	1.1	0.5	1.2	2.5	3.0
	83800	13.4	7.4	15.42	241	0.00514	199	0.00898	-803.46	7.62	.1872E+15	.4018E+06	1.0	0.5	1.1	2.5	2.9
	83600	12.1	7.7	14.38	237	0.00522	198	0.00931	-801.74	8.06	.1938E+15	.4151E+06	1.0	0.5	1.1	2.4	2.8
17 49 29	83501	11.5	7.8	13.87	235	0.00540	199	0.00947	-800.89	8.29	.1970E+15	.4216E+06	1.0	0.5	1.1	2.4	2.8

TIME (GMT)	ALT METERS	EWIND M/S	NWIND M/S	SPEED M/S	DIR DEG	PRESS MB	T K	DENSITY GM/M3	Z VEL M/S	Z ACC M/S/S	TDEN /CC	CF /S	***R M S NOISE ERROR IN*** DENS *****	PRFS PERCENT*****	TEMP *****	EW M/S	NN M/S
	83400	11.0	7.9	13.56	234	0.00550	198	0.00964	-799.86	8.50	.2007E+15	.4294E+06	1.0	0.5	1.1	2.4	2.7
	83200	10.0	8.1	12.95	231	0.00568	198	0.00998	-797.82	9.00	.2080E+15	.4446E+06	1.0	0.5	1.1	2.3	2.7
	83000	9.1	8.2	12.34	227	0.00588	198	0.01033	-795.78	9.48	.2153E+15	.4598E+06	0.9	0.4	1.0	2.2	2.6
	82800	8.1	8.4	11.73	223	0.00608	198	0.01070	-793.74	9.95	.2227E+15	.4751E+06	0.9	0.4	1.0	2.2	2.5
17.49.30	82689	7.6	8.5	11.39	221	0.00620	198	0.01091	-792.61	10.22	.2267E+15	.4835E+06	0.9	0.4	1.0	2.2	2.5
	82600	7.1	8.6	11.22	219	0.00629	197	0.01109	-791.36	10.45	.2307E+15	.4913E+06	0.9	0.4	1.0	2.1	2.5
	82400	6.1	8.8	10.85	214	0.00650	197	0.01150	-788.56	10.97	.2397E+15	.5089E+06	0.9	0.4	1.0	2.1	2.4
	82200	5.1	9.0	10.47	209	0.00673	196	0.01194	-785.75	11.50	.2488E+15	.5264E+06	0.9	0.4	1.0	2.1	2.3
	82000	4.1	9.1	10.10	204	0.00697	195	0.01238	-782.94	12.02	.2578E+15	.5440E+06	0.8	0.4	0.9	2.0	2.3
17.49.31	81902	3.7	9.2	9.92	201	0.00708	196	0.01261	-781.57	12.28	.2621E+15	.5526E+06	0.8	0.4	0.9	2.0	2.3
	81800	3.2	9.3	9.86	199	0.00721	195	0.01286	-779.78	12.56	.2676E+15	.5629E+06	0.8	0.4	0.9	2.0	2.2
	81600	2.4	9.3	9.76	194	0.00746	194	0.01335	-776.27	13.11	.2783E+15	.5830E+06	0.8	0.4	0.9	1.9	2.2
	81400	1.6	9.4	9.65	189	0.00772	193	0.01387	-772.77	13.66	.2890E+15	.6032E+06	0.8	0.4	0.9	1.9	2.1
	81200	0.8	9.5	9.54	185	0.00799	193	0.01440	-769.26	14.21	.2997E+15	.6233F+06	0.8	0.4	0.9	1.8	2.1
17.49.32	81138	0.6	9.5	9.50	183	0.00808	193	0.01460	-768.02	14.40	.3035E+15	.6305E+06	0.8	0.4	0.8	1.8	2.1
	81000	0.3	9.5	9.50	181	0.00827	192	0.01496	-765.35	14.76	.3116E+15	.6456E+06	0.8	0.4	0.8	1.8	2.0
	80800	-0.1	9.5	9.50	179	0.00856	191	0.01555	-761.21	15.32	.3242E+15	.6689E+06	0.7	0.3	0.8	1.8	2.0
	80600	-0.5	9.5	9.50	176	0.00886	190	0.01616	-757.07	15.87	.3368E+15	.6923E+06	0.7	0.3	0.8	1.7	1.9
	80400	-0.9	9.4	9.49	174	0.00917	190	0.01680	-752.94	16.43	.3494E+15	.7156E+06	0.7	0.3	0.8	1.7	1.9
17.49.33	80368	-1.0	9.4	9.49	174	0.00927	190	0.01690	-752.28	16.52	.3514E+15	.7193E+06	0.7	0.3	0.8	1.7	1.9
	80200	-1.2	9.4	9.50	172	0.00950	189	0.01742	-748.22	16.96	.3628E+15	.7420E+06	0.7	0.3	0.8	1.7	1.9
	80000	-1.4	9.4	9.50	171	0.00984	189	0.01806	-743.40	17.49	.3764E+15	.7690E+06	0.7	0.3	0.8	1.6	1.8
	79800	-1.6	9.4	9.51	170	0.01019	189	0.01873	-738.58	18.02	.3900F+15	.7959E+06	0.7	0.3	0.8	1.6	1.8
17.49.34	79614	-1.8	9.3	9.51	169	0.01052	189	0.01937	-734.12	18.51	.4026F+15	.8209E+06	0.7	0.3	0.7	1.6	1.7
	79600	-1.8	9.3	9.50	169	0.01055	189	0.01942	-733.72	18.55	.4038E+15	.8231E+06	0.7	0.3	0.7	1.6	1.7
	79400	-2.0	9.2	9.37	167	0.01093	189	0.02013	-728.34	19.05	.4192E+15	.8537E+06	0.7	0.3	0.7	1.5	1.7
	79200	-2.1	9.0	9.23	166	0.01131	188	0.02086	-722.97	19.55	.4346E+15	.8843E+06	0.7	0.3	0.7	1.5	1.7
	79000	-2.3	8.8	9.09	165	0.01172	188	0.02162	-717.60	20.05	.4500E+15	.9149E+06	0.7	0.3	0.7	1.5	1.6
17.49.35	78894	-2.4	8.7	9.02	164	0.01194	189	0.02203	-714.77	20.31	.4581F+15	.9310E+06	0.6	0.3	0.7	1.5	1.6
	78800	-2.4	8.6	8.94	164	0.01213	188	0.02240	-711.92	20.52	.4661E+15	.9474E+06	0.6	0.3	0.7	1.5	1.6
	78600	-2.4	8.4	8.78	164	0.01257	188	0.02319	-705.89	20.96	.4830E+15	.9821F+06	0.6	0.3	0.7	1.4	1.6
	78400	-2.4	8.3	8.62	163	0.01301	188	0.02400	-699.87	21.39	.4998E+15	.1017F+07	0.6	0.3	0.7	1.4	1.5
	78200	-2.5	8.1	8.46	163	0.01348	188	0.02485	-693.84	21.83	.5167F+15	.1052F+07	0.6	0.3	0.7	1.4	1.5
17.49.36	78183	-2.5	8.1	8.45	163	0.01352	189	0.02492	-693.33	21.87	.5181E+15	.1054E+07	0.6	0.3	0.7	1.4	1.5
	78000	-2.2	7.9	8.24	164	0.01396	189	0.02571	-687.23	22.20	.5351E+15	.1090E+07	0.6	0.3	0.7	1.4	1.5
	77800	-2.0	7.8	8.01	165	0.01445	189	0.02659	-680.57	22.57	.5537F+15	.1129E+07	0.6	0.3	0.7	1.3	1.4
	77600	-1.7	7.6	7.77	167	0.01497	189	0.02750	-673.91	22.94	.5723E+15	.1169E+07	0.6	0.2	0.7	1.3	1.4
17.49.37	77502	-1.6	7.5	7.66	167	0.01523	190	0.02796	-670.65	23.12	.5814E+15	.1188E+07	0.6	0.2	0.7	1.3	1.4
	77400	-1.4	7.4	7.53	169	0.01550	189	0.02844	-666.96	23.26	.5918E+15	.1210F+07	0.6	0.2	0.7	1.3	1.4
	77200	-1.1	7.2	7.27	171	0.01605	190	0.02940	-659.74	23.54	.6122E+15	.1254E+07	0.6	0.2	0.7	1.3	1.4
	77000	-0.8	7.0	7.01	173	0.01662	190	0.03039	-652.52	23.82	.6325E+15	.1298F+07	0.6	0.2	0.7	1.3	1.3
17.49.38	76842	-0.5	6.8	6.81	175	0.01708	191	0.03120	-646.83	24.05	.6486E+15	.1332E+07	0.6	0.2	0.6	1.2	1.3
	76800	-0.5	6.7	6.77	176	0.01721	190	0.03141	-645.20	24.08	.6533F+15	.1343E+07	0.6	0.2	0.6	1.2	1.3
	76600	-0.1	6.6	6.58	179	0.01781	191	0.03244	-637.51	24.27	.6754E+15	.1392E+07	0.6	0.2	0.6	1.2	1.3
	76400	0.2	6.4	6.39	182	0.01844	191	0.03351	-629.81	24.45	.6975E+15	.1441E+07	0.6	0.2	0.6	1.2	1.3
17.49.39	76205	0.6	6.2	6.21	185	0.01908	192	0.03458	-622.32	24.62	.7190E+15	.1488E+07	0.6	0.2	0.6	1.2	1.3
	76200	0.6	6.2	6.21	185	0.01909	192	0.03462	-622.09	24.62	.7197E+15	.1490E+07	0.6	0.2	0.6	1.2	1.3
	76000	1.1	6.1	6.23	190	0.01976	192	0.03579	-613.60	24.76	.7419E+15	.1534E+07	0.6	0.2	0.6	1.2	1.2
	75800	1.7	6.0	6.26	195	0.02046	192	0.03700	-605.10	24.78	.7701F+15	.1593E+07	0.6	0.2	0.6	1.2	1.2
17.49.40	75604	2.2	5.9	6.28	200	0.02116	193	0.03822	-596.82	24.85	.7947E+15	.1650E+07	0.6	0.2	0.6	1.1	1.2
	75600	2.2	5.9	6.28	200	0.02117	192	0.03825	-596.61	24.85	.7953E+15	.1652E+07	0.6	0.2	0.6	1.1	1.2
	75400	2.9	5.8	6.55	206	0.02191	192	0.03944	-588.22	24.84	.8207F+15	.1711E+07	0.6	0.2	0.6	1.1	1.2
	75200	3.5	5.8	6.81	211	0.02268	194	0.04067	-579.82	24.82	.8462E+15	.1771F+07	0.6	0.2	0.6	1.1	1.2

+++R M S NOISE ERROR IN+++

TIME	ALT METERS	EWIND M/S	NWIND M/S	SPEED M/S	DIR DEG	PRESS MB	T K	DENSITY GR/M3	Z VEL M/S	Z ACC M/S2	TDEN /CC	CF /S	DENS +++++PERCENT	PRES PERCENT	TEMP PERCENT+++++	EW M/S	NW M/S
17 49 41	75012	4.2	5.7	7.06	216	0.02340	195	0.04185	-571.96	24.81	.8701E+15	.1827E+07	0.6	0.2	0.7	1.1	1.1
	75000	4.2	5.7	7.08	216	0.02347	195	0.04191	-571.39	24.80	.8718E+15	.1831E+07	0.6	0.2	0.7	1.1	1.1
	74800	4.8	5.7	7.48	220	0.02429	195	0.04321	-562.44	24.68	.8992E+15	.1897E+07	0.6	0.2	0.7	1.1	1.1
	74600	5.4	5.7	7.84	221	0.02517	196	0.04454	-552.45	24.56	.9265E+15	.1962E+07	0.6	0.2	0.7	1.1	1.1
17 49 42	74456	5.8	5.7	8.11	225	0.02576	197	0.04551	-547.05	24.48	.9461E+15	.2009E+07	0.6	0.2	0.7	1.1	1.1
	74400	6.1	5.6	8.28	227	0.02606	197	0.04591	-544.48	24.42	.9549E+15	.2029E+07	0.6	0.2	0.7	1.1	1.1
	74200	6.9	5.5	8.88	231	0.02689	197	0.04717	-535.36	24.20	.9806E+15	.2100E+07	0.6	0.2	0.7	1.1	1.1
	74000	7.8	5.4	9.48	235	0.02782	198	0.04887	-526.12	23.99	.1016E+16	.2171E+07	0.7	0.2	0.7	1.0	1.1
17 49 43	73925	8.1	5.4	9.70	236	0.02817	199	0.04944	-522.72	23.91	.1028E+16	.2197E+07	0.7	0.2	0.7	1.0	1.1
	73800	8.6	5.3	10.11	238	0.02871	198	0.05038	-516.87	23.72	.1048E+16	.2246E+07	0.7	0.2	0.7	1.0	1.1
	73600	9.4	5.1	10.70	241	0.02975	199	0.05191	-507.46	23.41	.1080E+16	.2325E+07	0.7	0.2	0.7	1.0	1.0
17 49 44	73424	10.2	5.0	11.13	243	0.03064	200	0.05329	-499.26	23.14	.1108E+16	.2390E+07	0.7	0.2	0.7	1.0	1.0
	73400	10.3	5.0	11.41	244	0.03077	200	0.05348	-498.11	23.10	.1112E+16	.2401E+07	0.7	0.2	0.7	1.0	1.0
	73200	11.0	4.8	12.00	246	0.03181	201	0.05507	-488.90	22.71	.1145E+16	.2484E+07	0.7	0.2	0.7	1.0	1.0
	73000	11.8	4.6	12.64	248	0.03289	202	0.05661	-479.69	22.32	.1177E+16	.2567E+07	0.7	0.2	0.7	1.0	1.0
17 49 45	72931	12.0	4.5	12.85	249	0.03327	202	0.05717	-476.54	22.19	.1189E+16	.2595E+07	0.7	0.2	0.7	1.0	1.0
	72800	12.8	4.1	13.47	251	0.03400	203	0.05828	-470.41	21.89	.1212E+16	.2654E+07	0.7	0.2	0.7	1.0	1.0
	72600	13.9	4.0	14.42	254	0.03511	203	0.06001	-461.15	21.42	.1248E+16	.2742E+07	0.7	0.2	0.7	1.0	1.0
17 49 46	72470	14.6	3.7	15.04	255	0.03588	204	0.06115	-455.12	21.17	.1271E+16	.2799E+07	0.7	0.2	0.8	1.0	1.0
	72400	14.9	3.6	15.36	256	0.03630	204	0.06179	-451.87	20.94	.1285E+16	.2832E+07	0.7	0.2	0.8	1.0	1.0
	72200	16.0	3.1	16.27	258	0.03756	205	0.06362	-442.59	20.40	.1323E+16	.2927E+07	0.7	0.2	0.8	1.0	1.0
17 49 47	72034	16.8	2.7	17.02	260	0.03852	206	0.06518	-434.89	19.95	.1355E+16	.3005E+07	0.8	0.2	0.8	1.0	1.0
	72000	17.0	2.6	17.20	261	0.03874	206	0.06549	-433.36	19.85	.1362E+16	.3022E+07	0.8	0.2	0.8	1.0	1.0
	71800	18.1	2.1	18.21	263	0.04001	207	0.06733	-424.39	19.28	.1400E+16	.3123E+07	0.8	0.2	0.8	1.0	1.0
17 49 48	71607	19.1	1.5	19.19	265	0.04128	208	0.06915	-415.75	18.73	.1438E+16	.3270E+07	0.8	0.2	0.8	1.0	1.0
	71600	19.2	1.5	19.23	265	0.04133	208	0.06920	-415.47	18.70	.1439E+16	.3274E+07	0.8	0.2	0.8	1.0	1.0
	71400	20.5	0.8	20.52	267	0.04268	209	0.07114	-406.37	18.08	.1480E+16	.3331E+07	0.8	0.2	0.8	1.0	1.0
17 49 49	71203	21.8	0.2	21.78	269	0.04404	210	0.07307	-397.49	17.47	.1519E+16	.3435E+07	0.8	0.2	0.8	1.0	1.0
	71200	21.8	0.2	21.81	269	0.04407	209	0.07311	-397.33	17.45	.1520E+16	.3438E+07	0.8	0.2	0.8	1.0	1.0
	71000	23.2	-0.7	23.24	271	0.04549	210	0.07517	-388.42	16.80	.1562E+16	.3550E+07	0.8	0.2	0.9	1.0	1.0
17 49 50	70819	24.5	-1.5	24.52	273	0.04681	212	0.07708	-380.39	16.20	.1602E+16	.3651E+07	0.9	0.2	0.9	1.0	1.0
	70800	24.6	-1.6	24.69	273	0.04695	211	0.07727	-379.58	16.14	.1607E+16	.3663E+07	0.9	0.2	0.9	1.0	1.0
	70600	26.3	-2.5	26.41	275	0.04845	213	0.07923	-371.44	15.45	.1648E+16	.3781E+07	0.9	0.2	0.9	1.0	1.0
17 49 51	70449	27.5	-3.3	27.71	276	0.04961	214	0.08075	-365.31	14.94	.1679E+16	.3870E+07	0.9	0.2	0.9	1.0	1.0
	70400	27.9	-3.6	28.14	277	0.05008	214	0.08129	-360.24	14.77	.1690E+16	.3901E+07	0.9	0.2	0.9	1.0	1.0
	70200	29.5	-4.7	29.89	279	0.05158	215	0.08354	-354.83	14.06	.1727E+16	.4025E+07	0.9	0.2	1.0	1.0	1.0
17 49 52	70097	30.3	-5.3	30.79	279	0.05242	216	0.08472	-350.56	13.70	.1761E+16	.4089E+07	1.0	0.2	1.0	1.0	1.0
	BALLOON STILL INFLATED AT 70 KM																
	70000	31.1	-5.9	31.65	280	0.05321	215	0.08583	-346.96	13.36	.1785E+16	.4152E+07	1.0	0.2	1.0	1.0	1.0
	69800	32.6	-7.2	33.41	282	0.05488	216	0.08817	-339.50	12.66	.1833E+16	.4282E+07	1.0	0.2	1.0	1.0	1.0
17 49 53	69750	33.0	-7.5	33.87	283	0.05530	217	0.08875	-337.65	12.49	.1845E+16	.4314E+07	1.0	0.2	1.0	1.0	1.0
	69600	34.7	-8.4	35.28	284	0.05659	217	0.09050	-332.15	11.94	.1882E+16	.4416E+07	1.0	0.2	1.0	1.0	1.0
17 49 54	69430	35.6	-9.7	36.87	284	0.05808	219	0.09251	-325.95	11.32	.1927E+16	.4530E+07	1.0	0.2	1.1	1.0	1.0
	69400	35.8	-9.7	37.11	285	0.05824	218	0.09288	-324.93	11.21	.1934E+16	.4552E+07	1.1	0.2	1.1	1.0	1.0
	69200	37.3	-11.0	38.86	286	0.06014	219	0.09504	-318.26	10.50	.1982E+16	.4692E+07	1.1	0.2	1.1	1.0	1.0
17 49 55	69107	37.9	-11.6	39.66	287	0.06099	220	0.09650	-315.18	10.17	.2006E+16	.4757E+07	1.1	0.2	1.1	1.0	1.0
	69000	38.6	-12.2	40.50	287	0.06199	220	0.09776	-311.85	9.77	.2033E+16	.4826E+07	1.1	0.2	1.1	1.1	1.0
17 49 56	68806	39.8	-13.5	42.02	289	0.06382	222	0.10006	-305.90	9.05	.2080E+16	.4979E+07	1.2	0.2	1.2	1.1	1.0
	68800	39.8	-13.6	42.06	288	0.06389	222	0.10017	-305.70	9.03	.2082E+16	.4984E+07	1.2	0.2	1.2	1.1	1.0
	68600	40.7	-14.6	43.27	289	0.06586	224	0.10242	-299.84	8.33	.2130E+16	.5139E+07	1.2	0.2	1.2	1.1	1.0
17 49 57	68505	41.1	-15.0	43.78	290	0.06681	225	0.10350	-297.08	8.00	.2150E+16	.5212E+07	1.2	0.2	1.2	1.1	1.1
	68400	41.5	-15.5	44.30	290	0.06787	224	0.10511	-294.45	7.65	.2186E+16	.5295E+07	1.2	0.2	1.2	1.1	1.1
17 49 58	68211	42.2	-16.2	45.28	291	0.06979	[illegible]	0.10802	-289.76	7.02	.2246E+16	.5444E+07	1.3	0.2	1.3	1.1	1.1



TIME		ALT	EWIND	NWIND	SPEED	DIR	PRESS	T	DENSITY	Z VEL	Z ACC	TDEN	CF	***R.M.S. NOISE ERROR IN*** DENS	PRES	TEMP	EW	NW
		METERS	M/S	M/S	M/S	DEG	MB	K	GR/M3	M/S	M/S2	/CC	/S	*****	PERCENT	*****	M/S	M/S
17	50	21	62040	52.9	-1.2	53.90	271	0.16018	249	0.22419	-216.66	2.24	.1661E+16	.1251E+08	1.7	0.2	1.8	1.2	1.0
			62000	51.1	-0.8	51.16	270	0.16235	249	0.22652	-215.68	2.25	.1671E+16	.1267E+08	1.7	0.2	1.8	1.2	1.0
17	50	23	62078	51.1	-0.1	51.14	270	0.16504	250	0.22971	-214.37	2.26	.1776E+16	.1287E+08	1.8	0.2	1.8	1.2	1.0
			62000	52.1	0.0	52.46	269	0.16677	250	0.23181	-213.96	2.19	.1870E+16	.1301E+08	1.8	0.2	1.8	1.2	1.0
17	50	24	61870	52.7	0.6	53.66	269	0.16970	251	0.23541	-213.21	2.18	.1894E+16	.1324E+08	1.8	0.2	1.8	1.2	1.0
			61800	53.1	1.0	53.74	268	0.17170	251	0.23772	-211.39	2.19	.1943E+16	.1336E+08	1.8	0.2	1.8	1.1	1.0
17	50	25	61659	52.9	1.8	53.90	268	0.17456	251	0.24246	-209.75	2.19	.1941E+16	.1362E+08	1.8	0.2	1.8	1.1	1.0
			61600	53.4	2.2	53.97	267	0.17594	251	0.24409	-209.20	2.19	.1975E+16	.1373E+08	1.8	0.2	1.8	1.1	1.0
17	50	26	61447	54.0	3.1	54.11	266	0.17955	252	0.24831	-207.77	2.20	.2163E+16	.1401E+08	1.8	0.2	1.8	1.1	1.0
			61400	54.4	3.3	54.13	266	0.18068	251	0.24981	-207.22	2.19	.2194E+16	.1410E+08	1.8	0.2	1.8	1.1	1.0
17	50	27	61260	54.6	4.1	54.19	265	0.18453	252	0.25491	-205.44	2.19	.2300E+16	.1439E+08	1.8	0.2	1.8	1.1	1.0
			61200	54.8	4.1	54.19	265	0.18552	252	0.25586	-205.11	2.18	.2370E+16	.1447E+08	1.8	0.2	1.8	1.1	1.0
17	50	28	61021	54.9	5.0	54.20	264	0.18969	254	0.25968	-203.77	2.16	.2399E+16	.1480E+08	1.8	0.2	1.8	1.1	1.0
			61000	55.4	5.4	54.19	264	0.19047	254	0.26049	-203.49	2.16	.2416E+16	.1486E+08	1.8	0.2	1.8	1.1	1.0
17	50	29	60836	55.8	6.3	54.18	263	0.19470	256	0.26488	-201.95	2.14	.2507E+16	.1519E+08	1.8	0.2	1.8	1.1	1.0
			60800	55.7	6.5	54.17	263	0.19504	256	0.26608	-201.50	2.13	.2532E+16	.1525E+08	1.8	0.2	1.8	1.1	1.0
17	50	30	60610	55.4	7.4	55.94	262	0.19993	255	0.27276	-199.31	2.12	.2671E+16	.1560E+08	1.8	0.2	1.8	1.1	1.0
			60600	55.2	7.6	55.89	261	0.20074	256	0.27375	-198.98	2.11	.2692E+16	.1566E+08	1.8	0.2	1.8	1.1	1.0
17	50	31	60400	55.9	8.3	55.60	261	0.20513	256	0.27917	-197.23	2.10	.2803E+16	.1600E+08	1.8	0.2	1.8	1.1	0.9
			60400	56.8	8.4	55.52	260	0.20608	256	0.28032	-196.83	2.09	.2828E+16	.1608E+08	1.8	0.2	1.8	1.1	0.9
17	50	32	60200	56.4	9.1	56.17	260	0.21063	256	0.28617	-194.93	2.07	.2949E+16	.1643E+08	1.8	0.2	1.8	1.1	0.9
			60000	56.7	9.1	55.97	260	0.21123	256	0.28736	-194.50	2.06	.2976E+16	.1648E+08	1.8	0.2	1.8	1.1	0.9
17	50	33	60041	56.7	9.3	56.94	259	0.21410	254	0.29325	-192.50	2.03	.3097E+16	.1670E+08	1.8	0.2	1.8	1.1	0.9
			BALLOON STILL INFLATED AT 60 KM																
			60000	56.7	9.3	56.91	259	0.21534	254	0.29480	-192.04	2.03	.3129E+16	.1680E+08	1.8	0.2	1.8	1.1	0.9
17	50	34	59850	56.5	9.6	56.41	259	0.21957	255	0.30008	-190.51	2.02	.3239E+16	.1713E+08	1.8	0.2	1.8	1.1	0.9
			59800	56.4	9.6	56.33	259	0.22106	255	0.30173	-190.04	2.01	.3273E+16	.1725E+08	1.8	0.2	1.8	1.1	0.9
17	50	35	59660	56.2	9.7	56.10	259	0.22512	256	0.30621	-188.78	2.00	.3366E+16	.1756E+08	1.8	0.2	1.9	1.1	0.9
			59600	56.1	9.6	56.99	259	0.22691	256	0.30791	-188.29	1.99	.3402E+16	.1770E+08	1.8	0.2	1.9	1.1	0.9
17	50	36	59471	56.9	9.6	56.78	259	0.23069	258	0.31149	-187.26	1.97	.3476E+16	.1800E+08	1.8	0.2	1.9	1.1	0.9
			59400	56.4	9.5	56.73	259	0.23289	257	0.31462	-186.38	1.96	.3542E+16	.1817E+08	1.9	0.2	1.9	1.1	0.9
17	50	37	59292	56.8	9.4	56.67	259	0.23615	258	0.31929	-185.10	1.95	.3638E+16	.1842E+08	1.9	0.2	1.9	1.1	0.9
			59200	56.8	9.3	56.67	259	0.23900	258	0.32270	-184.22	1.93	.3689E+16	.1865E+08	1.9	0.2	1.9	1.1	0.9
17	50	38	59105	56.8	9.2	56.67	259	0.24196	259	0.32522	-183.32	1.90	.3761E+16	.1887E+08	1.9	0.2	1.9	1.0	0.9
			59000	56.4	9.0	56.67	259	0.24526	259	0.32907	-182.26	1.88	.3842E+16	.1913E+08	1.9	0.2	1.9	1.0	0.9
17	50	39	58911	56.9	8.8	56.66	260	0.24808	260	0.33236	-181.16	1.87	.3916F+16	.1935E+08	1.9	0.2	1.9	1.0	0.9
			58800	51.4	8.6	51.76	260	0.25166	259	0.33730	-180.14	1.86	.7014E+16	.1963E+08	1.9	0.2	1.9	1.0	0.9
17	50	40	58731	51.1	8.5	51.81	260	0.25382	260	0.34037	-179.41	1.86	.7077E+16	.1980E+08	1.9	0.2	1.9	1.0	0.9
			58600	51.-	8.2	51.98	260	0.25827	259	0.34631	-177.93	1.85	.7206E+16	.2014E+08	1.9	0.2	1.9	1.0	0.9
17	50	41	58561	51.4	8.1	52.03	260	0.25942	260	0.34793	-177.54	1.84	.7234E+16	.2024E+08	1.9	0.2	1.9	1.0	0.9
			58400	51.7	7.7	52.20	261	0.26496	259	0.35614	-175.58	1.83	.7405E+16	.2067E+08	1.9	0.2	1.9	1.0	0.9
17	50	42	58380	51.8	7.7	52.33	261	0.26545	259	0.35687	-175.41	1.83	.7419E+16	.2071E+08	1.9	0.2	1.9	1.0	0.9
17	50	43	58270	52.1	7.4	52.59	261	0.27118	259	0.36526	-173.44	1.81	.7584E+16	.2115E+08	1.9	0.2	1.9	1.0	0.9
			58200	52.1	7.3	52.62	262	0.27190	258	0.36586	-173.28	1.81	.7607E+16	.2121E+08	1.9	0.2	1.9	1.0	0.9
17	50	44	58044	52.1	7.0	52.84	262	0.27741	261	0.37050	-172.05	1.76	.7703E+16	.2164E+08	1.9	0.2	1.9	1.0	0.9
			58000	52.5	6.9	52.94	262	0.27898	261	0.37233	-171.58	1.75	.7739E+16	.2176E+08	1.9	0.2	1.9	1.0	0.9
17	50	45	57871	52.8	6.8	53.24	262	0.28352	262	0.37716	-170.25	1.70	.7841E+16	.2212E+08	1.9	0.2	2.0	1.0	0.8
			57800	52.4	6.8	53.29	262	0.28470	262	0.37932	-169.59	1.66	.7887E+16	.2233E+08	1.9	0.2	2.0	1.0	0.8
17	50	46	57700	52.9	6.7	53.37	262	0.28986	264	0.38227	-168.72	1.62	.7948E+16	.2261F+08	2.0	0.2	2.0	1.0	0.8
			57600	52.4	6.8	53.33	262	0.29350	265	0.38518	-167.87	1.58	.8012F+16	.2290E+08	2.0	0.2	2.0	1.0	0.8
17	50	47	57520	52.9	6.8	53.20	262	0.29617	266	0.38754	-167.28	1.50	.8057E+16	.2310E+08	2.0	0.2	2.0	1.0	0.8
			57400	52.6	7.1	53.11	262	0.30103	266	0.39348	-165.80	1.50	.8181E+16	.2348E+08	2.0	0.2	2.0	1.0	0.8
17	50	48	57256	52.6	7.2	53.07	262	0.30270	267	0.39561	-165.42	1.49	.8212E+16	.2358E+08	2.0	0.2	2.0	1.0	0.8

TIME GMT	HGT METERS	EWIND M/S	NWIND M/S	SPEED M/S	DIR DEG	PRESS MB	T K	DENSITY GM/M3	Z VEL M/S	Z ACC M/S2	[illegible] /CC	F /S	DENS	PRES	TEMP	EW M/S	NW M/S
													++++ NOISE ERROR IN++++				
													+++++PERCENT++++				
17 50 49	57209	[illegible] 1	7.5	52.68	261	0.2330[illegible]	267	0.40166	-167.[illegible]	1.[illegible]	8[illegible]E+16	[illegible]E+08	2.[illegible]	0.2	2.0	1.0	0.8
	57000	52.1	7.5	52.65	261	0.2[illegible]	267	0.40[illegible]	-167.73	1.[illegible]	8[illegible]E+16	[illegible]E+08	2.[illegible]	0.2	2.0	1.0	0.8
17 50 50	57028	51.5	8.[illegible]	[illegible]	261	0.2[illegible]	[illegible]	0.40762	-162.5[illegible]	1.40	[illegible]E+16	.2456E+08	[illegible]	0.2	2.0	1.0	0.8
	57000	51.[illegible]	[illegible]	[illegible].94	261	0.21647	269	0.40968	-162.[illegible]	[illegible]	8[illegible]E+16	.2469E+08	[illegible]	0.2	2.0	1.0	0.8
17 50 51	56870	50.5	[illegible]	[illegible]	[illegible]	0.221[illegible]	270	0.41[illegible]	-16[illegible]	1.[illegible]	[illegible]1E+16	.25[illegible]E+08	2.0	0.2	2.0	1.0	0.8
	56800	50.[illegible]	[illegible]	[illegible]	[illegible]	0.22[illegible]	[illegible]	0.41[illegible]78	-1[illegible]	1.[illegible]	[illegible]E+16	.25[illegible]E+08	2.0	0.2	2.0	1.0	0.8
17 50 52	56717	[illegible]	9.[illegible]	[illegible]	25[illegible]	0.22[illegible]	270	0.4[illegible]	-15[illegible].88	1.[illegible]	[illegible]88E+16	.25[illegible]	[illegible]	0.2	2.0	1.0	0.8
	56600	48.[illegible]	9.8	[illegible]	25[illegible]	0.2[illegible]	270	0.4[illegible]	-1[illegible].06	1.[illegible]	.8902E+16	[illegible]	[illegible]	0.2	2.0	1.0	0.8
17 50 53	56551	[illegible]	[illegible]	[illegible]	253	0.22[illegible]	[illegible]	0.42[illegible]	-1[illegible]	1.[illegible]	[illegible]E+16	[illegible]			2.0	1.0	0.8
17 50 54	56402	46.[illegible]	10.[illegible]	[illegible]	[illegible]	0.2[illegible]	[illegible]	0.4[illegible]	[illegible]	1.[illegible]	[illegible]E+16	[illegible]	2.[illegible]	0.2	2.0	1.0	0.8
	56400	4[illegible]	10.6	[illegible]	[illegible]	0.23687	[illegible]	0.[illegible]95	-1[illegible]	1.[illegible]	9100E+16	[illegible]E+08	2.0	0.2	2.0	1.0	0.8
17 50 55	56239	45.[illegible]	11.[illegible]	[illegible]	[illegible]	0.24[illegible]	2[illegible]	0.44689	-1[illegible]	1.[illegible]	[illegible]E+16	.27[illegible]E+08	2.0	0.2	2.0	1.0	0.8
	56200	44	[illegible]	[illegible]	[illegible]	0.24[illegible]	2[illegible]	0.4[illegible]	-15[illegible]	1.[illegible]	[illegible]E+16	.27[illegible]E+08	[illegible]	0.2	2.0	1.0	0.8
17 50 56	56086	43.7	12.[illegible]	[illegible]	[illegible]	0.25[illegible]	[illegible]	0.45[illegible]	-15[illegible]	1.[illegible]	9.[illegible]E+16	.2[illegible]E+08	2.0	0.2	2.1	1.0	0.8
	56000	42.[illegible]	12.[illegible]	[illegible]	[illegible]	0.2[illegible]	2[illegible]	0.46[illegible]	-1[illegible]	1.[illegible]	[illegible]E+16	.2794E+08	2.0	0.2	2.1	1.0	0.8
17 50 57	55932	42.[illegible]	12.9	[illegible]	[illegible]	0.25[illegible]	[illegible]	0.4[illegible]	-152.99	1.[illegible]	9.[illegible]E+16	.281[illegible]E+08	2.1	0.2	2.1	1.0	0.8
	55800	41.[illegible]	1[illegible]	[illegible]	25[illegible]	0.26[illegible]	[illegible]	0.47[illegible]	-1[illegible].75	1.[illegible]	[illegible]E+16	.2[illegible]E+08	2.1	0.2	2.1	1.0	0.8
17 50 58	55786	41.0	1[illegible]	[illegible].22	251	0.2[illegible]	[illegible]	0.47628	-1[illegible].62	1.[illegible]	9.[illegible]E+16	.28[illegible]E+08	2.1	0.2	2.1	1.0	0.8
17 50 59	55626	39.[illegible]	14.[illegible]	[illegible].27	2[illegible]	0.2[illegible]	2[illegible]	0.4886[illegible]	-149.[illegible]	1.[illegible]	10[illegible]E+17	.2[illegible]E+08	2.1	0.2	2.1	0.9	0.8
	55600	39.[illegible]	14.[illegible]	[illegible]	[illegible]	0.2[illegible]	[illegible]	0.48[illegible]	-14[illegible]	1.[illegible]	[illegible]18E+17	.2937E+08	2.1	0.2	2.1	0.9	0.8
17 51 0	55481	38.[illegible]	14.6	[illegible].56	[illegible]	0.27[illegible]	269	0.49536	-14[illegible].8[illegible]	1.[illegible]	[illegible]E+17	.2980E+08	2.1	0.2	2.1	0.9	0.8
	55400	38.4	1[illegible]	[illegible]	[illegible]	0.28097	[illegible]	0.50017	-14[illegible].04	1.[illegible]	.10[illegible]E+17	.3011E+08	2.1	0.2	2.1	0.9	0.8
17 51 1	55208	38.0	15.[illegible]	40.86	2[illegible]	0.28944	2[illegible]	0.50604	-147.[illegible]	1.[illegible]	.10[illegible]E+17	.30[illegible]E+08	2.1	0.2	2.1	0.9	0.8
	55200	37.[illegible]	15.[illegible]	40.12	2[illegible]	0.29073	268	0.50[illegible]87	-146.[illegible]	1.3[illegible]	.1068E+17	.3087E+08	2.1	0.2	2.1	0.9	0.8
17 51 2	55185	37.1	15.[illegible]	40.6[illegible]	2[illegible]	0.29[illegible]	[illegible]	0.51472	-14[illegible].[illegible]	1.[illegible]	.1070E+17	.30[illegible]E+08	2.1	0.2	2.1	0.9	0.8
17 51 3	55038	36.[illegible]	15.[illegible]	[illegible].68	2[illegible]	0.30390	[illegible]	0.51[illegible]43	-14[illegible].[illegible]	1.3[illegible]	.1091E+17	.3100E+08	2.1	0.2	2.1	0.9	0.8
					BALLOON STILL INFLATED AT 55 K												
	55000	36.5	15.[illegible]	39.61	247	0.3[illegible]	[illegible]	0.5[illegible]	-14[illegible].60	1.[illegible]	.1097E+17	.3165E+08	2.1	0.2	2.1	0.9	0.7
17 51 4	54892	36.[illegible]	15.2	39.40	2[illegible]	0.3[illegible]	[illegible]	0.5[illegible]	-141.58	1.3[illegible]	.11[illegible]E+17	.3208E+08	2.1	0.2	2.1	0.9	0.7
	54800	36.[illegible]	15.0	39.2[illegible]	2[illegible]	0.31[illegible]	[illegible]	0.5[illegible]	-141.98	1.3[illegible]	.11[illegible]E+17	.3245E+08	2.1	0.2	2.1	0.9	0.7
17 51 5	54755	36.1	14.9	39.[illegible]	[illegible]	0.31[illegible]	[illegible]	0.5[illegible]55	-141.70	1.34	.1130E+17	.3263E+08	2.1	0.2	2.1	0.9	0.7
17 51 6	546[illegible]	36.[illegible]	14.5	39.0	[illegible]	0.3[illegible]	2[illegible]	0.55079	-141.13	1.34	.1156E+17	.3326E+08	2.1	0.2	2.1	0.9	0.7
	54600	36.[illegible]	14.[illegible]	39.[illegible]	248	0.32655	267	0.55607	-141.[illegible]	1.35	.1156E+17	.3327E+08	2.1	0.2	2.1	0.9	0.7
17 51 7	54465	36.5	14.1	39.1[illegible]	248	0.3[illegible]180	266	0.56652	-13[illegible].65	1.36	.1180E+17	.3384E+08	2.1	0.2	2.1	0.9	0.7
	54400	36.8	13.[illegible]	39.36	2[illegible]	0.33[illegible]	267	0.57409	-139.98	1.36	.1194E+17	.3412E+08	2.1	0.2	2.1	0.9	0.7
17 51 8	54336	37.1	13.6	39.5[illegible]	249	0.34085	265	0.57949	-138.33	1.37	.1205E+17	.3440E+08	2.1	0.2	2.2	0.9	0.7
	54200	37.5	12.[illegible]	[illegible]	250	0.34864	2[illegible]	0.59216	-136.76	1.36	.12[illegible]1E+17	.3500E+08	2.2	0.2	2.2	0.9	0.7
17 51 9	54191	37.5	12.5	39.65	251	0.34917	264	0.59298	-136.66	1.36	.12[illegible]E+17	.3503E+08	2.2	0.2	2.2	0.9	0.7
17 51 10	54060	38.[illegible]	12.2	[illegible].89	252	0.35666	263	0.60137	-135.19	1.34	.1257E+17	.3562E+08	2.2	0.2	2.2	0.9	0.7
	54000	38.[illegible]	11.9	40.[illegible]	252	0.36019	263	0.60348	-134.68	1.32	.1265E+17	.3590E+08	2.2	0.2	2.2	0.9	0.7
17 51 11	53925	38.7	11.[illegible]	40.[illegible]	253	0.36458	26[illegible]	0.61259	-134.04	1.32	.1276E+17	.3624E+08	2.2	0.2	2.2	0.9	0.7
	53800	38.[illegible]	10.8	40.71	254	0.37201	2[illegible]	0.62281	-132.87	1.29	.1295E+17	.3682E+08	2.2	0.2	2.2	0.9	0.7
17 51 12	53791	[illegible]	10.6	40.[illegible]	254	0.47255	264	0.62346	-132.79	1.29	.1296E+17	.3686E+08	2.2	0.2	2.2	0.9	0.7
17 51 13	53[illegible]	[illegible]	10.1	40.14	255	0.38[illegible]	264	0.63309	-131.58	1.26	.1316E+17	.3748E+08	2.2	0.2	2.2	0.9	0.7
	53600	[illegible]	9.9	41.17	256	0.38115	264	0.63796	-131.00	1.24	.1326E+17	.3777E+08	2.2	0.2	2.2	0.9	0.7
17 51 14	53505	40.1	9.6	41.21	256	0.38670	26[illegible]	0.64164	-130.29	1.23	.1329E+17	.3817E+08	2.2	0.2	2.2	0.9	0.7
17 51 15	53[illegible]	40.[illegible]	9.[illegible]	41.26	257	0.39611	26[illegible]	0.65[illegible]	-129.35	1.19	.1355E+17	.3872E+08	2.2	0.2	2.2	0.9	0.7
	53400	40.[illegible]	9.[illegible]	41.26	257	0.39656	[illegible]	0.65[illegible]	-129.32	1.19	.1356E+17	.3874E+08	2.2	0.2	2.2	0.9	0.7
17 51 16	53268	40.3	9.[illegible]	41.24	2[illegible]	0.40489	[illegible]	0.66[illegible]	-12[illegible]	1.[illegible]	.138[illegible]E+17	.3938E+08	2.2	0.2	2.2	0.9	0.7
	53200	40.1	[illegible]	41.1[illegible]	257	0.40[illegible]	26[illegible]	0.66903	-12[illegible]	1.16	.1392E+17	.3973E+08	2.2	0.2	2.3	0.9	0.7
17 51 17	53135	40.0	8.7	40.96	257	0.[illegible]	2[illegible]	0.67[illegible]	-1[illegible].65	1.15	.1401E+17	.4005E+08	2.3	0.2	2.3	0.9	0.7
17 51 18	53016	39.[illegible]	8.4	40.[illegible]	2[illegible]	0.[illegible]	[illegible]	0.[illegible]	-1[illegible].86	1.13	.1415E+17	.4066E+08	2.3	0.2	2.3	0.9	0.7
	53000	39.[illegible]	8.4	40.[illegible]	25[illegible]	0.[illegible]	[illegible]	0.[illegible]	-1[illegible].67	1.17	.1418E+17	.4075E+08	2.3	0.2	2.3	0.9	0.7

TIME ZULU	ALT METERS	EWIND M/S	NWIND M/S	SPEED M/S	DIR DEG	PRESS MB	T K	DENSITY GR/M3	Z VEL M/S	Z ACC M/S2	TDEN /CC	CF /S	***R M S NOISE ERROR IN*** DENS *****PERCENT	PRES	TEMP*****	EW M/S	NW M/S
17 51 19	52886	38.6	8.1	39.47	258	0.52990	264	0.69937	-124.49	1.12	.1454E+17	.4134E+08	2.3	0.2	2.3	0.9	0.7
	52800	38.0	7.9	38.81	258	0.53575	263	0.70826	-123.56	1.10	.1472E+17	.4179E+08	2.3	0.2	2.3	0.8	0.7
17 51 20	52768	37.8	7.8	38.57	258	0.53793	262	0.71156	-123.22	1.09	.1479E+17	.4196E+08	2.3	0.2	2.3	0.8	0.7
17 51 21	52644	36.8	7.5	37.61	258	0.54646	264	0.72164	-122.20	1.05	.1500E+17	.4263E+08	2.3	0.2	2.3	0.8	0.7
	52600	36.4	7.5	37.17	258	0.54954	264	0.72474	-121.87	1.04	.1507E+17	.4287E+08	2.3	0.2	2.3	0.8	0.7
17 51 22	52521	35.6	7.4	36.38	258	0.55504	265	0.73027	-121.30	1.02	.1518E+17	.4330E+08	2.3	0.2	2.3	0.8	0.7
17 51 23	52404	34.4	7.0	35.16	258	0.56331	265	0.74100	-120.21	0.98	.1541E+17	.4394E+08	2.3	0.2	2.3	0.8	0.7
	52400	34.4	7.0	35.12	258	0.56364	264	0.74133	-120.18	0.98	.1541E+17	.4397E+08	2.3	0.2	2.3	0.8	0.7
17 51 24	52277	33.6	6.8	34.31	258	0.57243	266	0.75008	-119.41	0.96	.1559E+17	.4465E+08	2.3	0.2	2.4	0.8	0.7
	52200	33.0	6.5	33.67	258	0.57806	265	0.75886	-118.63	0.95	.1578E+17	.4509E+08	2.4	0.2	2.4	0.8	0.7
17 51 25	52167	32.8	6.4	33.41	258	0.58042	265	0.76254	-118.30	0.95	.1585E+17	.4528E+08	2.4	0.2	2.4	0.8	0.7
17 51 26	52047	32.0	6.0	32.56	259	0.58934	265	0.77410	-117.45	0.95	.1609E+17	.4597E+08	2.4	0.2	2.4	0.8	0.7
	52000	31.8	5.7	32.28	259	0.59285	265	0.77830	-117.12	0.95	.1618E+17	.4625E+08	2.4	0.2	2.4	0.8	0.6
17 51 27	51931	31.4	5.4	31.86	260	0.59799	266	0.78445	-116.63	0.94	.1631E+17	.4665E+08	2.4	0.2	2.4	0.8	0.6
17 51 28	51817	30.8	4.9	31.20	261	0.60672	264	0.79970	-115.55	0.96	.1663E+17	.4733E+08	2.4	0.2	2.4	0.8	0.6
	51800	30.8	4.8	31.13	261	0.60804	264	0.80108	-115.47	0.96	.1666E+17	.4743E+08	2.4	0.2	2.4	0.8	0.6
17 51 29	51695	30.5	4.2	30.76	262	0.61615	265	0.80952	-114.99	0.98	.1683E+17	.4806E+08	2.4	0.2	2.4	0.8	0.6
	51600	30.4	3.7	30.64	263	0.62366	263	0.82521	-113.86	0.98	.1716E+17	.4865E+08	2.4	0.2	2.4	0.8	0.6
17 51 30	51580	30.4	3.6	30.61	263	0.62524	263	0.82853	-113.62	0.99	.1723E+17	.4877E+08	2.4	0.2	2.4	0.8	0.6
17 51 31	51476	30.2	2.9	30.29	264	0.63358	263	0.84005	-112.82	0.97	.1747E+17	.4942E+08	2.4	0.2	2.4	0.8	0.6
	51400	30.2	2.4	30.31	265	0.63978	262	0.84997	-112.04	0.95	.1767E+17	.4991E+08	2.4	0.2	2.4	0.8	0.6
17 51 32	51362	30.2	2.2	30.32	265	0.64287	262	0.85493	-111.66	0.95	.1777E+17	.5015E+08	2.4	0.2	2.4	0.8	0.6
17 51 33	51242	30.4	1.6	30.44	267	0.65281	261	0.87061	-110.44	0.90	.1810E+17	.5092E+08	2.4	0.2	2.5	0.8	0.6
	51200	30.4	1.4	30.46	267	0.65638	261	0.87441	-110.10	0.88	.1818E+17	.5120E+08	2.5	0.2	2.5	0.8	0.6
17 51 34	51138	30.5	1.1	30.50	267	0.66155	262	0.87990	-109.62	0.85	.1829E+17	.5161E+08	2.5	0.2	2.5	0.8	0.6
17 51 35	51028	30.4	0.5	30.43	269	0.67091	263	0.88845	-108.92	0.80	.1847E+17	.5234E+08	2.5	0.2	2.5	0.8	0.6
	51000	30.5	0.4	30.46	269	0.67338	263	0.89124	-108.69	0.79	.1853E+17	.5253E+08	2.5	0.2	2.5	0.8	0.6
17 51 36	50922	30.6	0.1	30.55	269	0.68009	264	0.89883	-108.09	0.76	.1869E+17	.5305E+08	2.5	0.2	2.5	0.8	0.6
17 51 37	50809	30.7	-0.2	30.73	270	0.68986	264	0.90981	-107.30	0.73	.1892E+17	.5381E+08	2.5	0.2	2.5	0.8	0.6
	50800	30.7	-0.2	30.75	270	0.69073	264	0.91062	-107.25	0.72	.1893E+17	.5388E+08	2.5	0.2	2.5	0.8	0.6
17 51 38	50701	31.0	-0.3	30.97	270	0.69943	265	0.91884	-106.73	0.71	.1910E+17	.5456E+08	2.5	0.2	2.5	0.8	0.6
	50600	31.3	-0.3	31.27	270	0.70841	266	0.92601	-106.30	0.70	.1925E+17	.5526E+08	2.5	0.2	2.5	0.8	0.6
17 51 39	50593	31.3	-0.3	31.29	270	0.70901	267	0.92649	-106.27	0.69	.1926E+17	.5531E+08	2.5	0.2	2.5	0.8	0.6
17 51 40	50498	31.6	-0.2	31.57	270	0.71748	266	0.93824	-105.66	0.71	.1951E+17	.5597E+08	2.5	0.2	2.5	0.8	0.6
	50400	31.9	0.1	31.87	269	0.72648	266	0.95072	-105.05	0.72	.1977E+17	.5667E+08	2.5	0.2	2.5	0.8	0.6
17 51 41	50396	31.9	0.1	31.88	269	0.72681	266	0.95119	-105.03	0.72	.1978E+17	.5670E+08	2.5	0.2	2.5	0.8	0.6
17 51 42	50290	32.2	0.7	32.19	268	0.73656	265	0.96663	-104.28	0.74	.2010E+17	.5746E+08	2.5	0.2	2.5	0.8	0.6
	50200	32.4	1.3	32.42	267	0.74509	263	0.98460	-103.37	0.75	.2047E+17	.5812E+08	2.1	0.2	2.1	0.8	0.6
17 51 43	50179	32.4	1.4	32.48	267	0.74703	263	0.98870	-103.17	0.76	.2056E+17	.5827E+08	2.0	0.2	2.0	0.8	0.6
17 51 44	50077	32.7	2.1	32.78	266	0.75718	262	1.00523	-102.29	0.75	.2090E+17	.5906E+08	2.0	0.2	2.0	0.8	0.6
BALLOON STILL INFLATED AT 50 KM																	
	50000	33.0	2.8	33.11	265	0.76436	262	1.01524	-101.76	0.74	.2111E+17	.5963E+08	2.0	0.2	2.0	0.8	0.6
17 51 45	49971	33.1	3.0	33.24	264	0.76712	262	1.01909	-101.53	0.74	.2119E+17	.5984E+08	2.0	0.2	2.0	0.8	0.6
17 51 46	49869	33.4	3.9	33.59	263	0.77728	262	1.03318	-100.80	0.72	.2148E+17	.6063E+08	2.0	0.2	2.0	0.8	0.6
	49800	33.6	4.4	33.90	262	0.78417	262	1.04252	-100.29	0.71	.2167E+17	.6117E+08	2.0	0.2	2.1	0.8	0.6
17 51 47	49768	33.7	4.7	34.05	262	0.78731	262	1.04678	-100.06	0.70	.2176E+17	.6142E+08	2.0	0.2	2.1	0.8	0.6
17 51 48	49676	33.9	5.5	34.36	260	0.79664	263	1.05619	-99.53	0.68	.2196E+17	.6214E+08	2.1	0.2	2.1	0.8	0.6
	49600	34.1	6.0	34.59	259	0.80447	263	1.06498	-99.07	0.66	.2214E+17	.6275E+08	2.1	0.2	2.1	0.8	0.6
17 51 49	49572	34.1	6.2	34.67	259	0.80730	263	1.06816	-98.81	0.65	.2221E+17	.6297E+08	2.1	0.2	2.1	0.8	0.6
17 51 50	49472	34.4	7.0	35.00	258	0.81763	264	1.07841	-98.26	0.62	.2242E+17	.6378E+08	2.1	0.2	2.1	0.8	0.6
	49400	34.4	7.5	35.26	257	0.82517	265	1.08297	-97.99	0.60	.2252E+17	.6437E+08	2.1	0.2	2.1	0.8	0.6
17 51 51	49375	34.5	7.7	35.34	257	0.82770	266	1.08450	-97.90	0.59	.2255E+17	.6457E+08	2.1	0.2	2.1	0.8	0.6
17 51 52	[illegible]	34.6	8.4	35.60	256	0.83799	266	1.09686	-97.30	0.58	.2280E+17	.6537E+08	2.1	0.2	2.1	0.8	0.6

RATIO OF AMPLITUDE OF SMOOTHED DENSITY WAVE TO AMPLITUDE OF ORIGINAL WAVE AS A FUNCTION OF ALTITUDE AND WAVELENGTH.
(ALTITUDE AND WAVELENGTH MEASURED IN KILOMETERS.)/

ALTITUDE

WAVELENGTH	100	90	80	70	60	50	40	30
1	0.01	0.01	0.01	0.01	0.01	0.22	0.42	0.75
2	0.01	0.01	0.01	0.04	0.22	0.52	0.80	0.90
5	0.01	0.02	0.03	0.47	0.84	0.90	0.96	0.99
10	0.47	0.51	0.59	0.72	0.97	0.98	0.99	0.99
20	0.94	0.95	0.96	0.98	0.99	0.99	0.99	0.99

RATIO OF AMPLITUDE OF SMOOTHED SINUSOIDAL WIND TO AMPLITUDE OF ORIGINAL WIND AS A FUNCTION OF ALTITUDE AND WAVELENGTH.
(ALTITUDE AND WAVELENGTH MEASURED IN KILOMETERS.)/

ALTITUDE

WAVELENGTH	100	90	80	70	60	50	40	30
1	0.01	0.01	0.01	0.01	0.01	0.02	0.57	0.96
2	0.01	0.01	0.01	0.03	0.10	0.40	0.76	0.99
5	0.02	0.03	0.06	0.18	0.70	0.98	0.99	0.99
10	0.14	0.17	0.24	0.85	0.97	0.99	0.99	0.99
20	0.58	0.63	0.66	0.90	0.98	0.99	0.99	0.99

III. CONCLUSION

The conversion of the ROBIN program from the UNIVAC 1108 system to the Interdata 7/32 system has been accomplished. The resultant outputs agree to within 1 m/s on winds and .06% on pressure, temperature and density.

The coefficients for Legendre polynomial smoothing can be stored in a data table, thus, saving 32,000 bytes of storage. However, in storing the coefficients in a data table, there must be 4 corrections made in the FORTRAN source code.

The code changes must be made in ROBIN and TROBIN as indicated below.

ROBIN

Line 209	NEND = N2ST + NZ2
Change to	NEND = N2ST + NZ2 - 1
Line 216	NEND = NXY2 + N2ST
Change to	NEND = NXY2 + N2ST - 1

TROBIN

Line 37	NEND = N2ST + NZ2
Change to	NEND = N2ST + NZ2 - 1
Line 44	NEND = NXY2 + N2ST
Change to	NEND = NXY2 + N25T - 1

Without these changes one non-existent data point is smoothed by a non-existent coefficient. In the present UNIVAC program the non-existent coefficient is set to zero, thus the added smoothed point value is zero and does not change the filtered output. By storing the filter coefficients in a table, the non-existent coefficient is not zero and a large error occurs in the filtered output.

The same smoothing is done in FITON but the correct code exists as indicated.

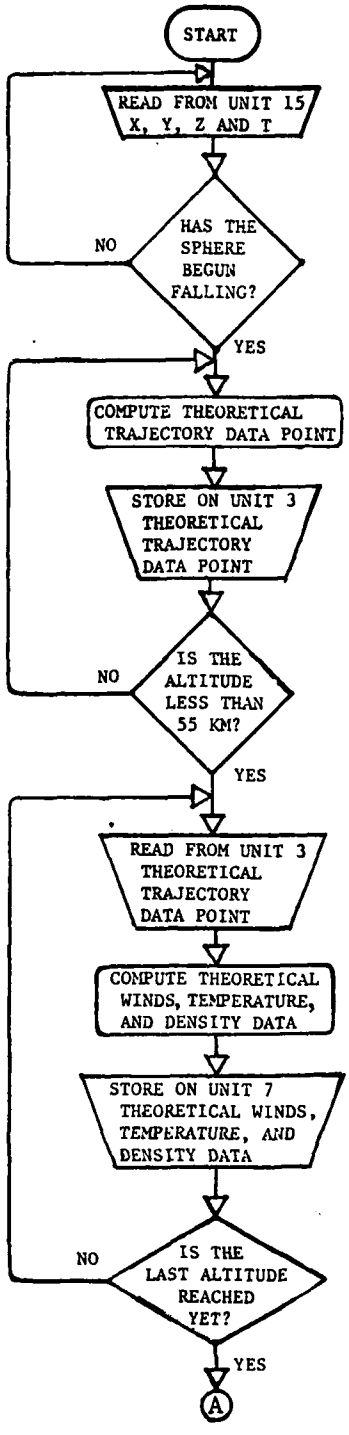
FITON

Line 16	NEND = NZ1 + N1ST - 1
Line 28	NEND = NXY1 + N1ST - 1

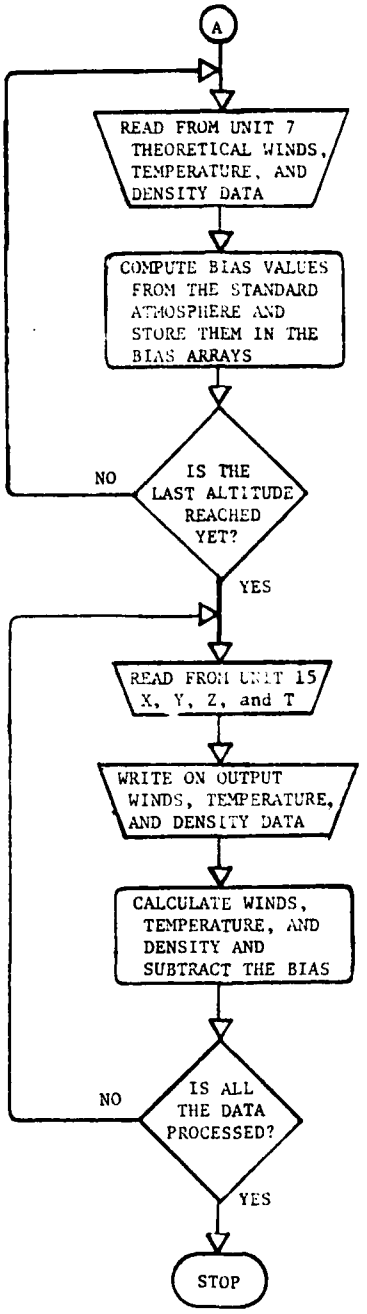
The program will yield accurate results on the Interdata system. When data from the Nike radar is obtained, further programs would be required to edit the raw data before running the program.

IV. FLOWCHARTS

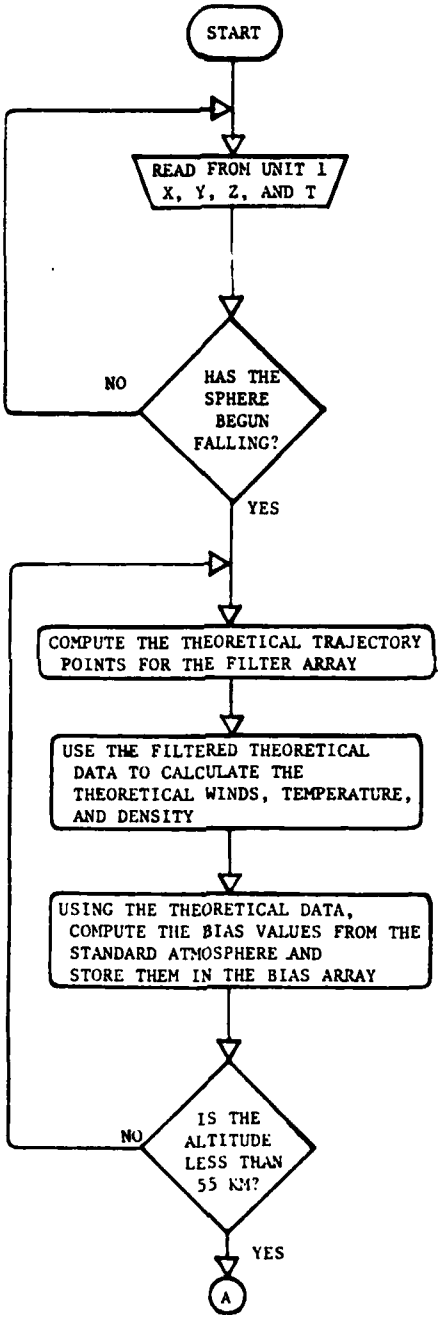
UNIVAC 1108 GENERAL DATA FLOW



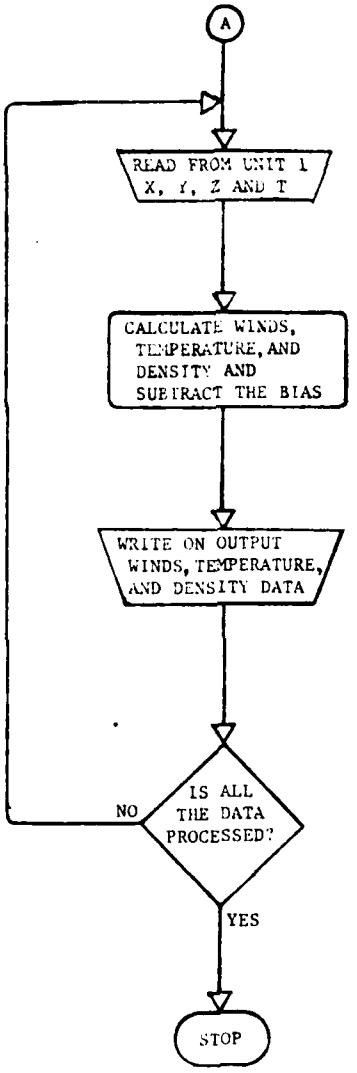
UNIVAC 1108 GENERAL DATA FLOW



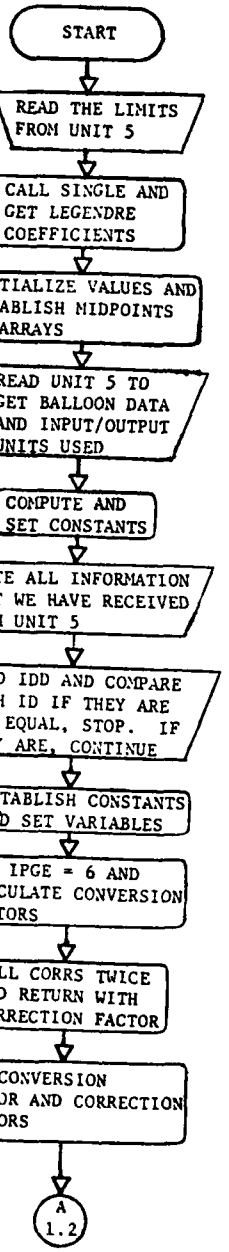
INTERDATA 7-32 GENERAL DATA FLOW



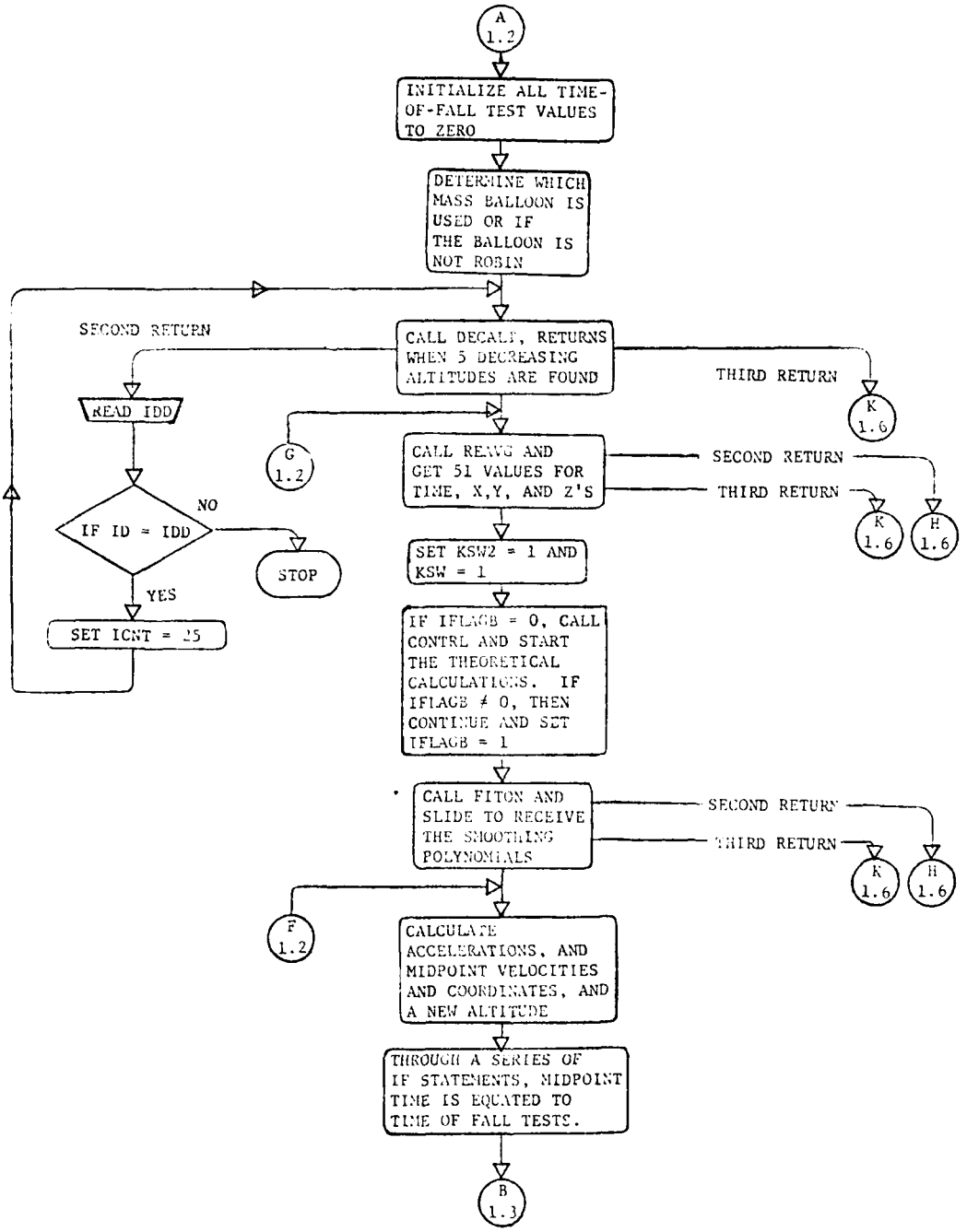
INTERDATA 7-32 GENERAL DATA FLOW



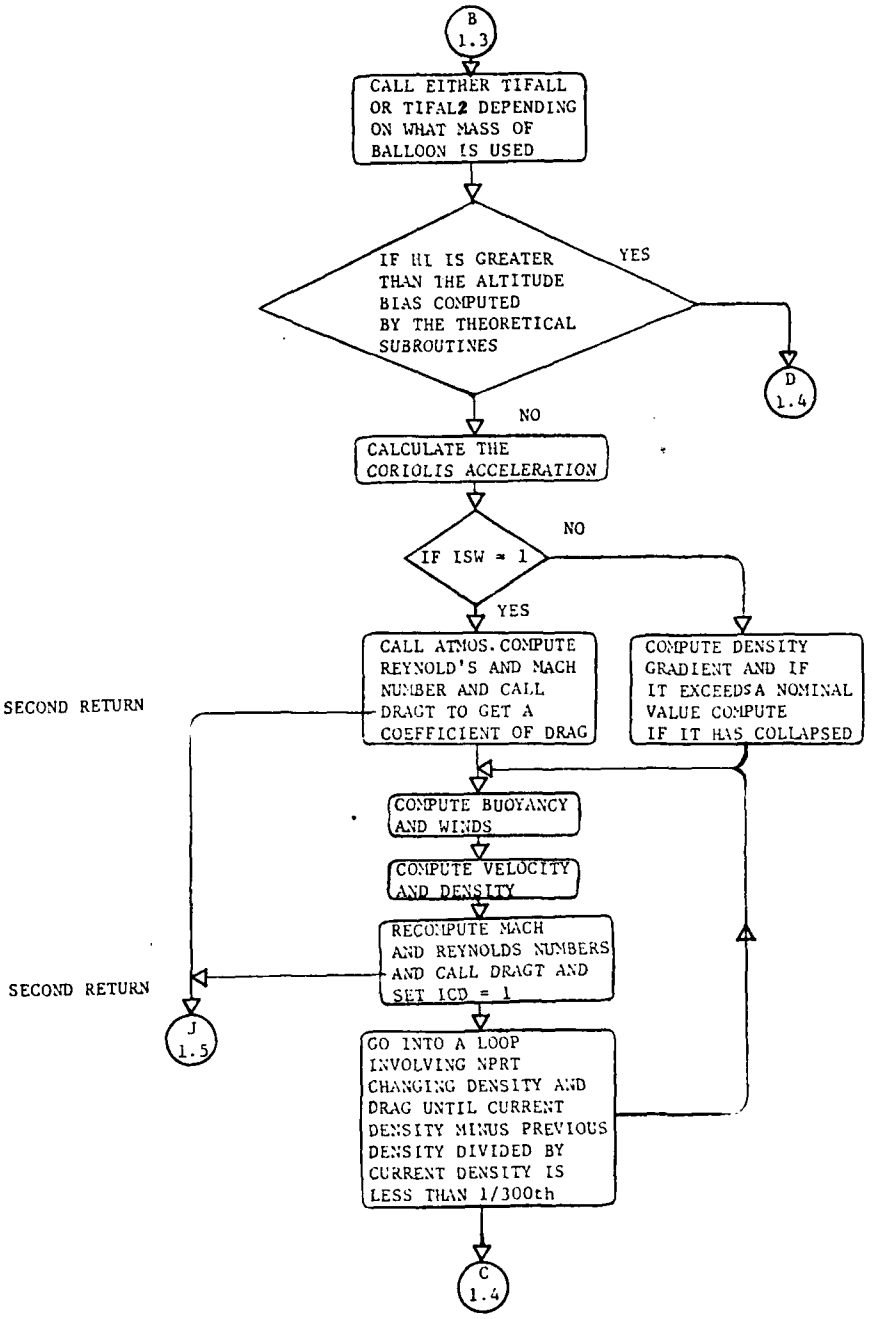
FLOWCHART FOR MAIN PROGRAM ROBIN - 1.1



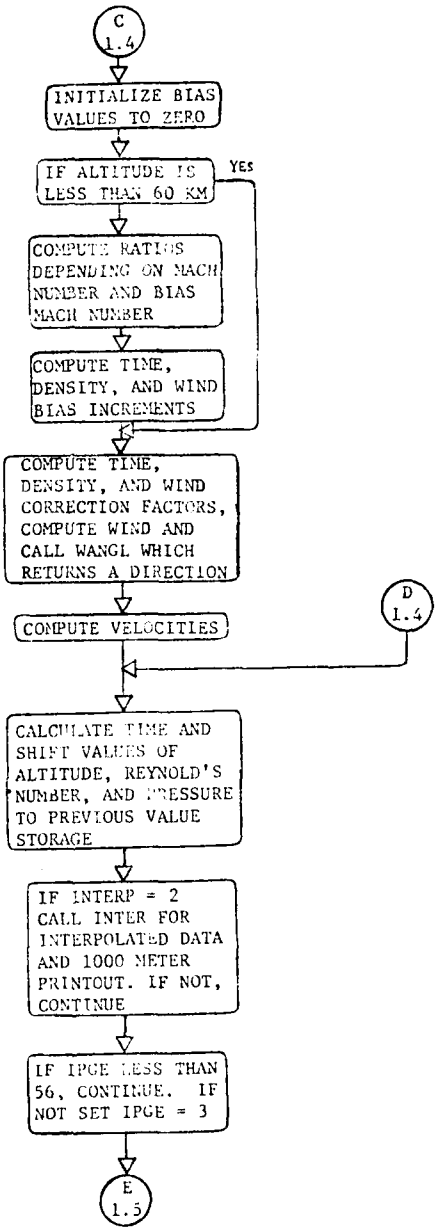
FLOWCHART FOR MAIN PROGRAM ROBIN - 1.2



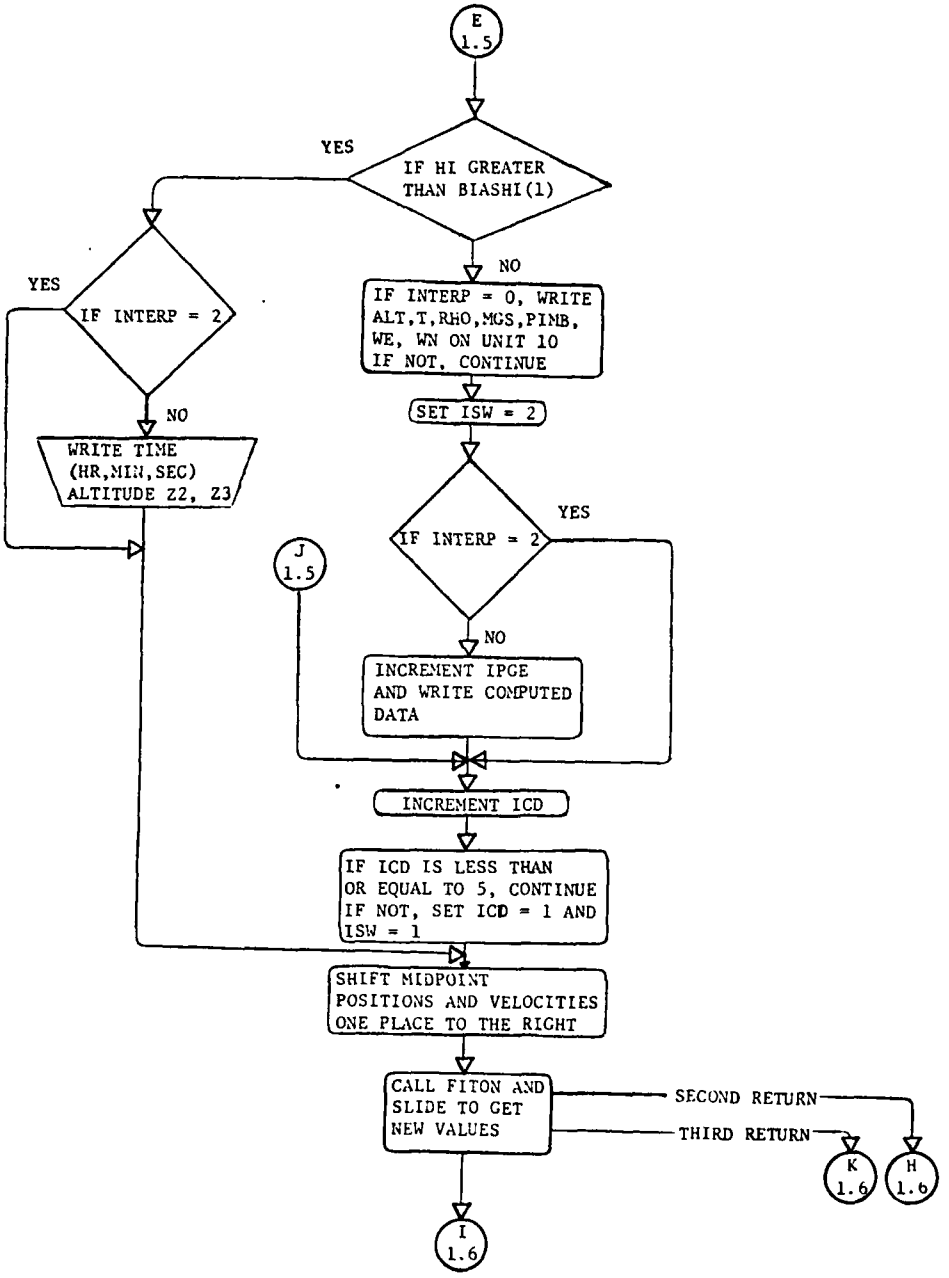
FLOWCHART FOR MAIN PROGRAM ROBIN - 1.3



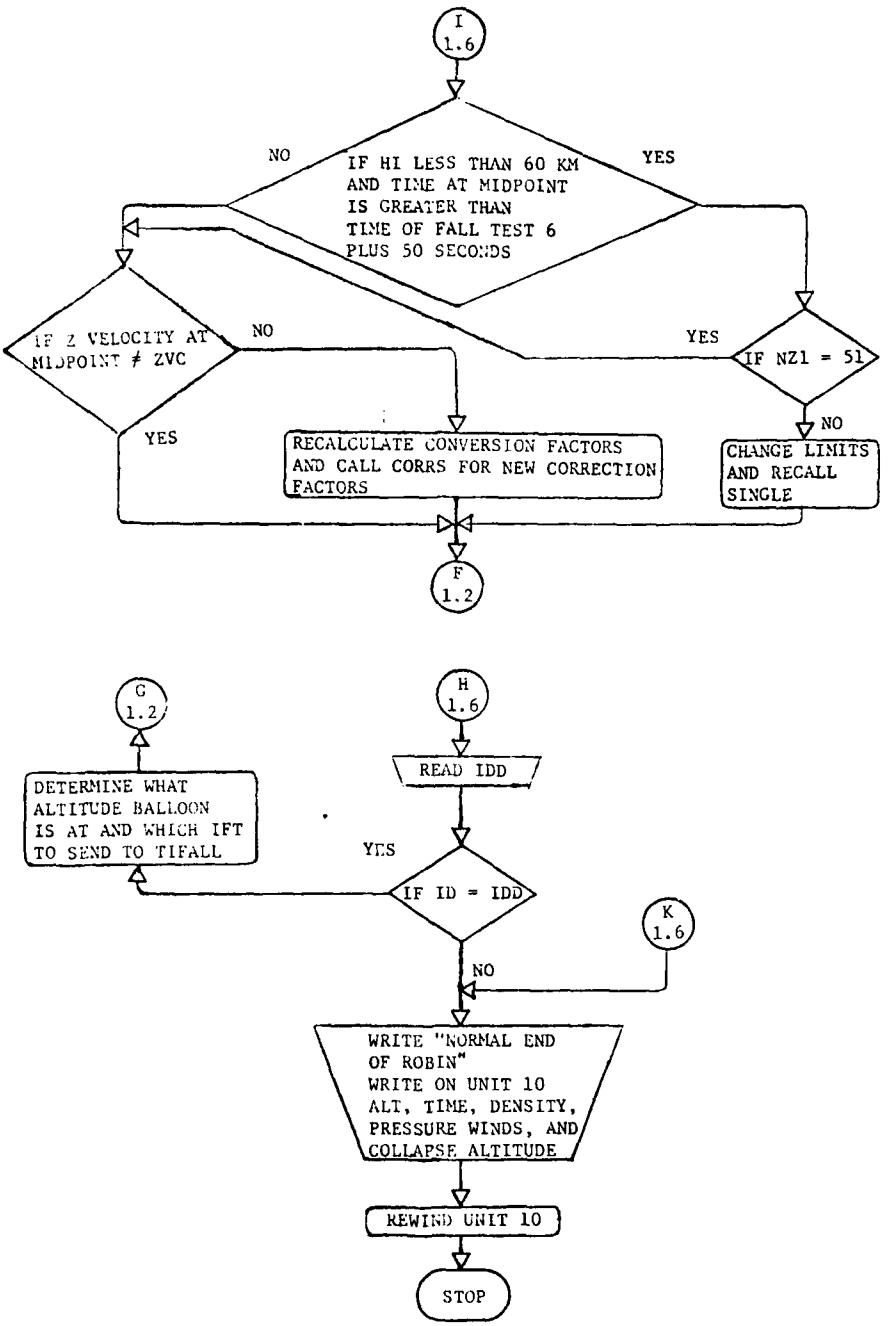
FLOWCHART FOR MAIN PROGRAM ROBIN - 1.4



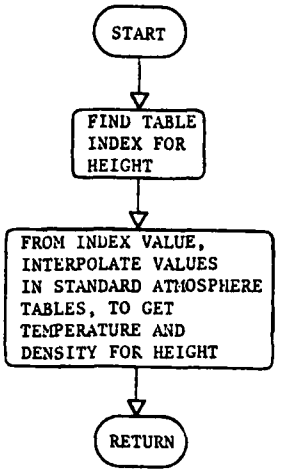
FLOWCHART FOR MAIN PROGRAM ROBIN - 1.5



FLOWCHART FOR MAIN PROGRAM ROBIN - 1.6

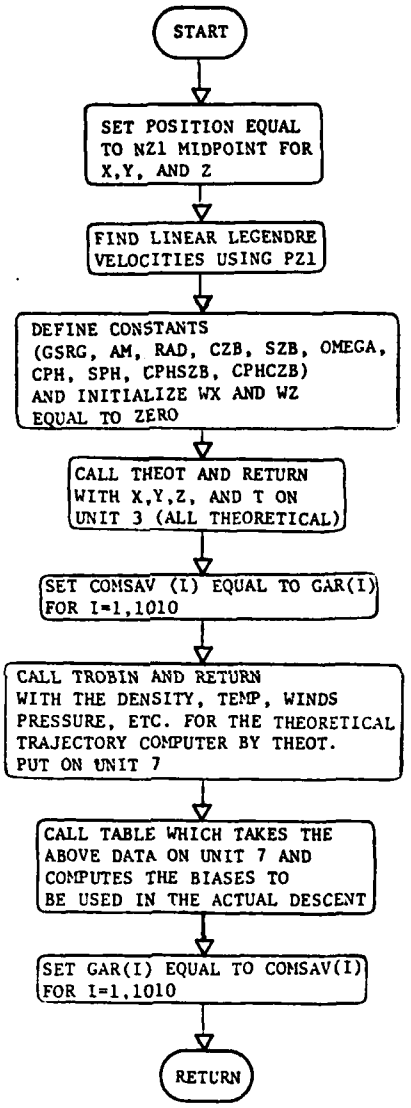


FLOWCHART FOR SUBROUTINE ATMOS - 2.1

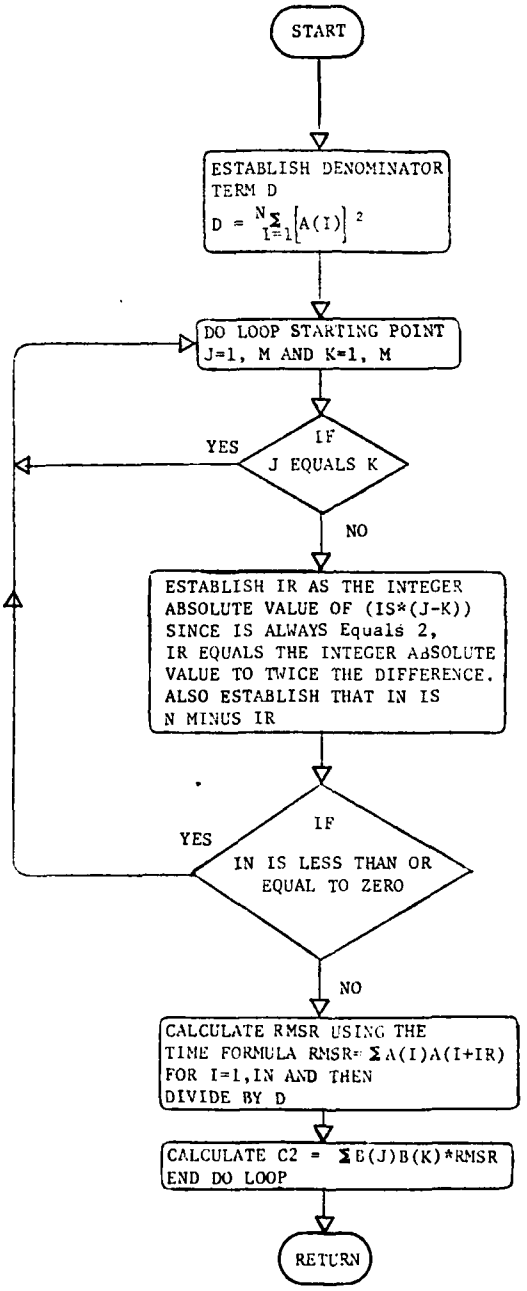


FLOWCHART FOR SUBROUTINE BLKDAT - 3.1

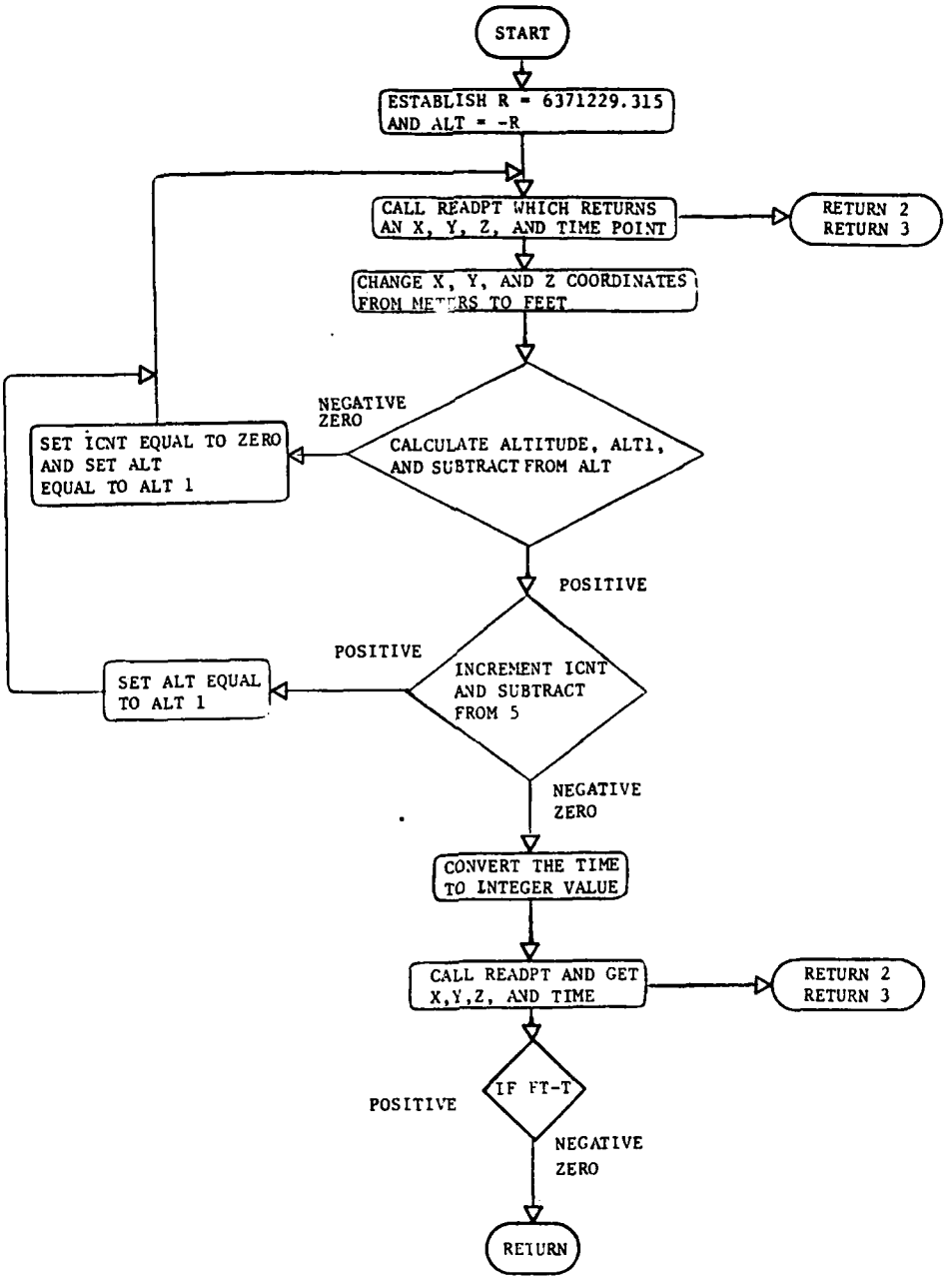
FLOWCHART FOR SUBROUTINE CONTROL - 4.1



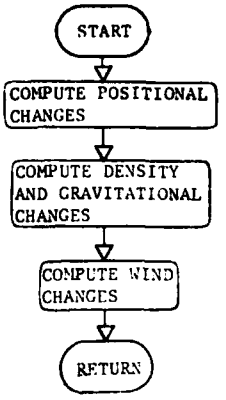
FLOWCHART FOR SUBROUTINE CORRS - 5.1



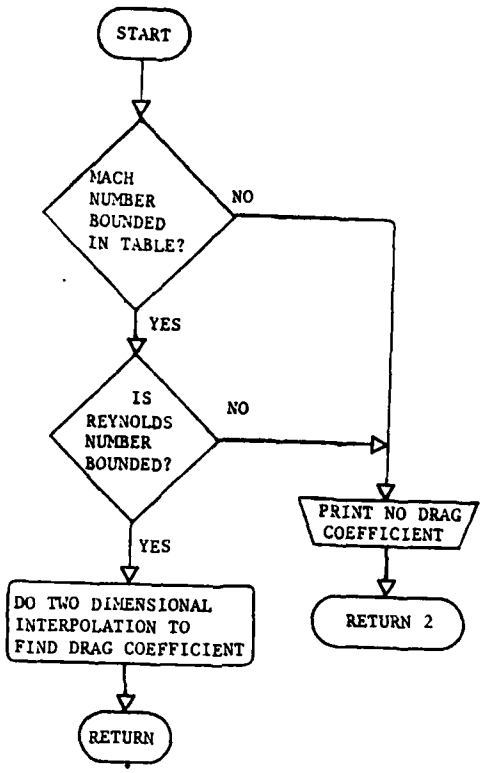
FLOWCHART FOR SUBROUTINE DECALT - 6.1



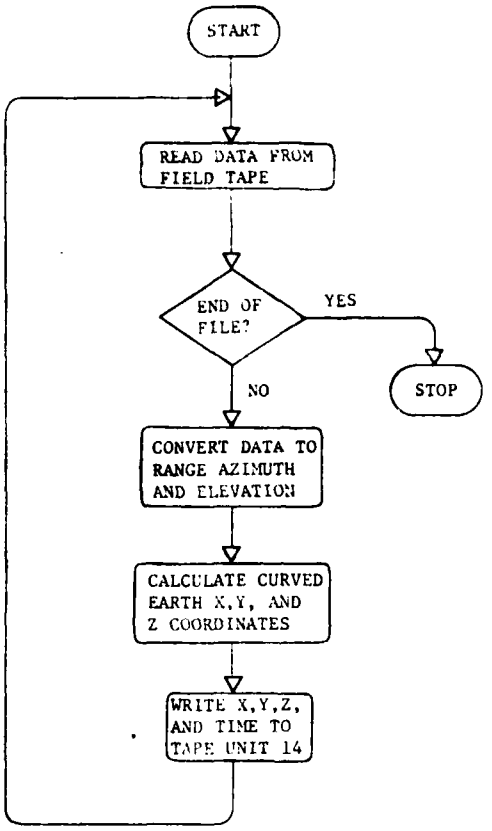
FLOWCHART FOR SUBROUTINE DEV - 7.1



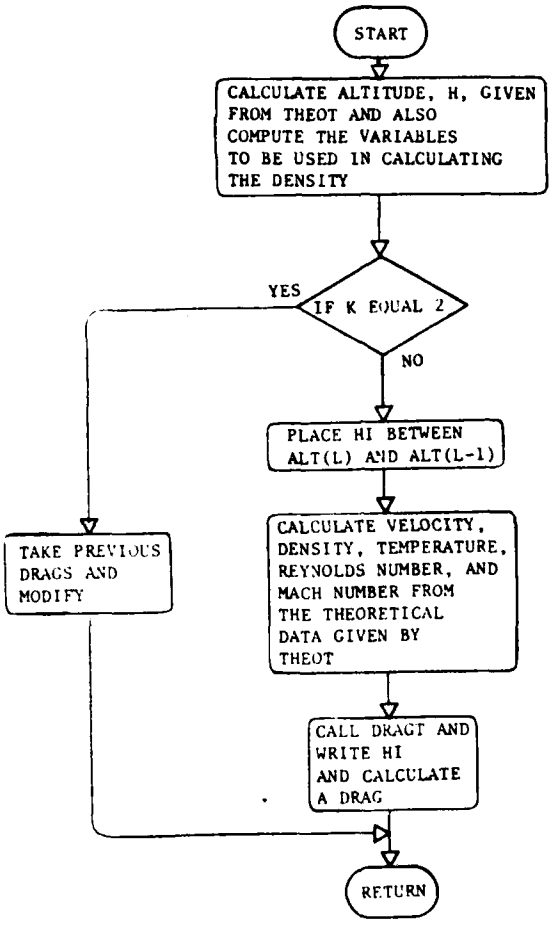
FLOWCHART FOR SUBROUTINE DRAGT - 8.1



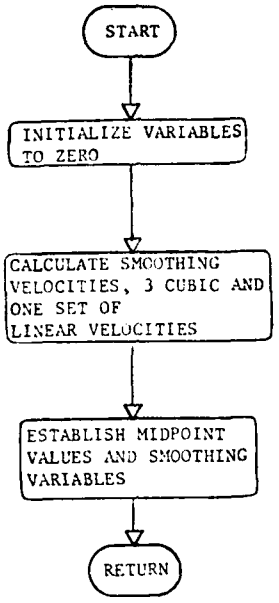
FLOWCHART FOR MAIN PROGRAM DRIVE - 9.1



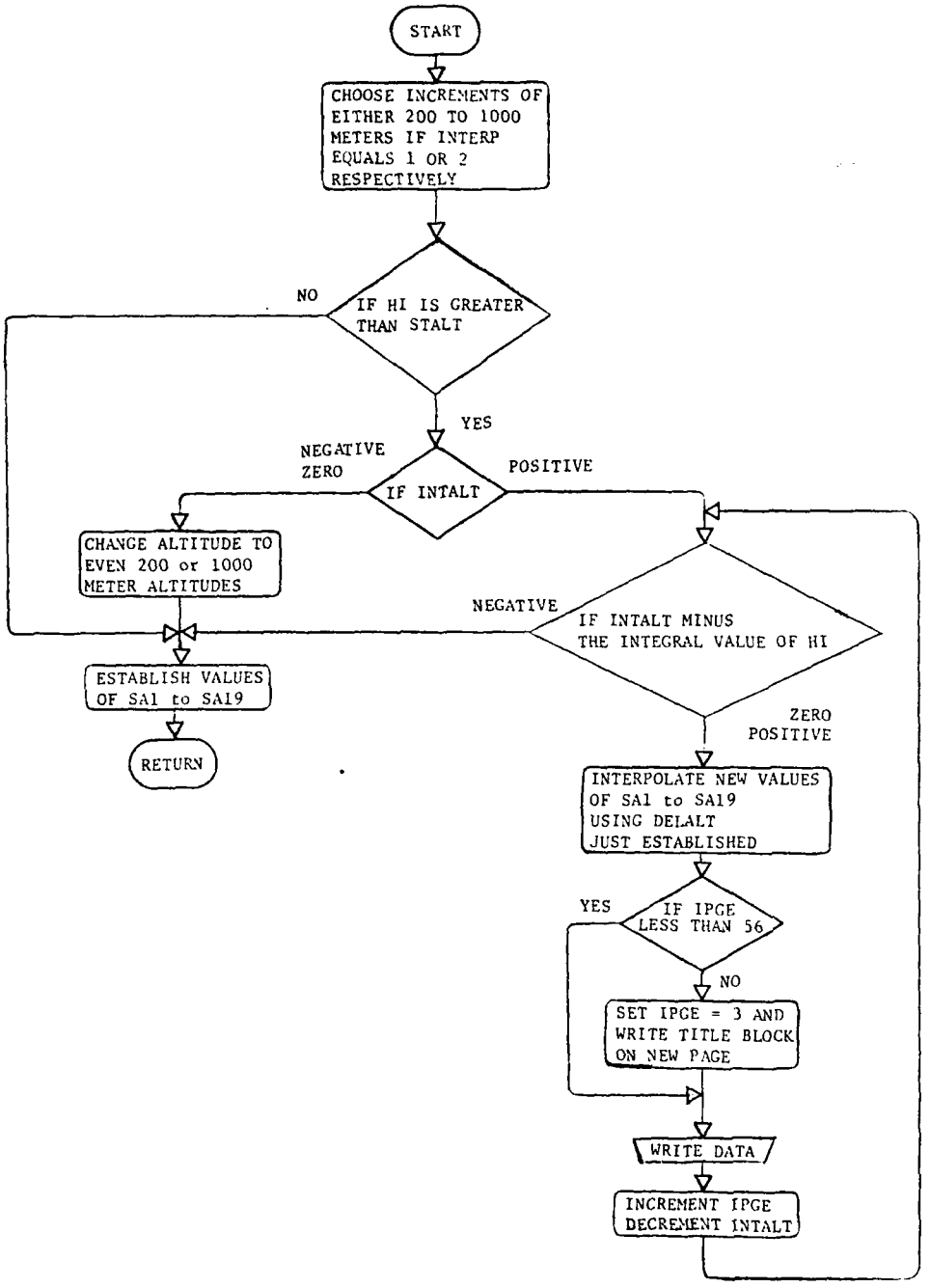
FLOWCHART FOR SUBROUTINE DRVT - 10.1



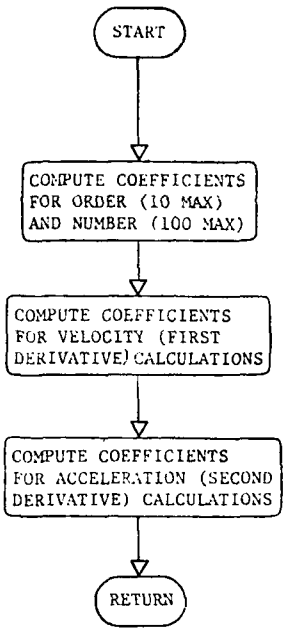
FLOWCHART FOR SUBROUTINE FITON - 11.1



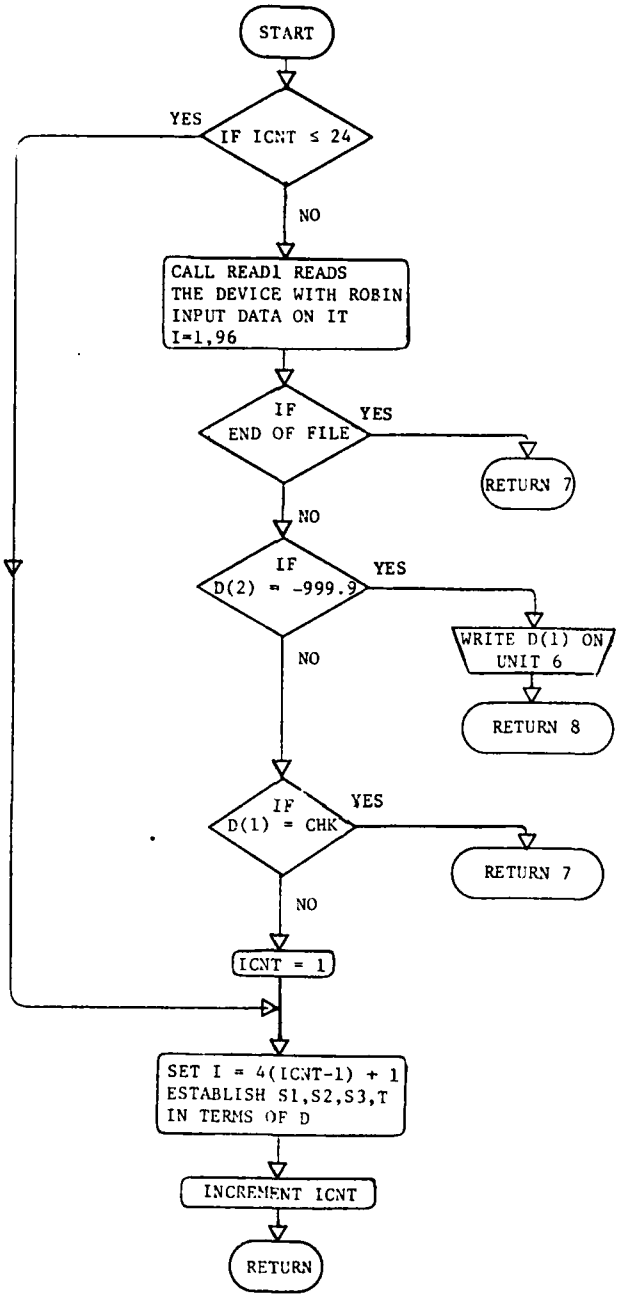
FLOWCHART FOR SUBROUTINE INTER 12.1



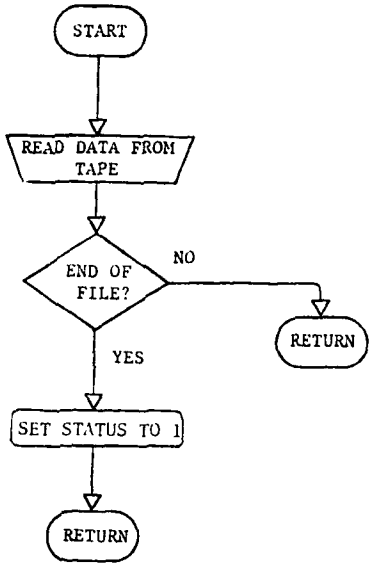
FLOWCHART FOR SUBROUTINE LEGNDR - 13.1



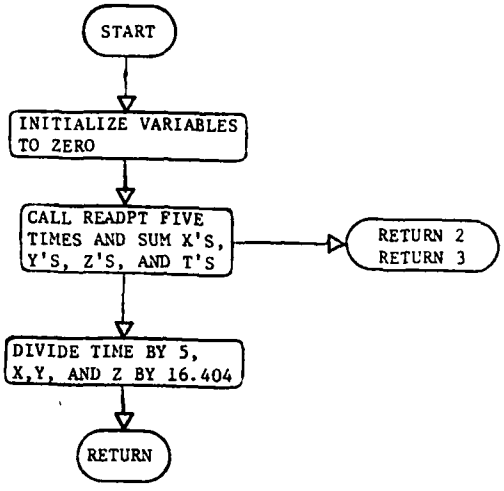
FLOWCHART FOR SUBROUTINE READPT - 15.1



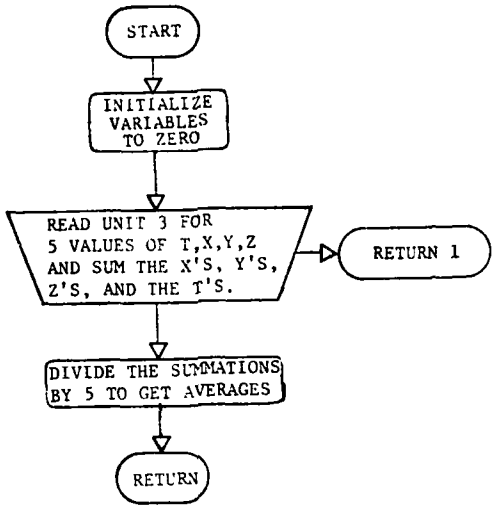
FLOWCHART FOR SUBROUTINE READ1 - 16.1



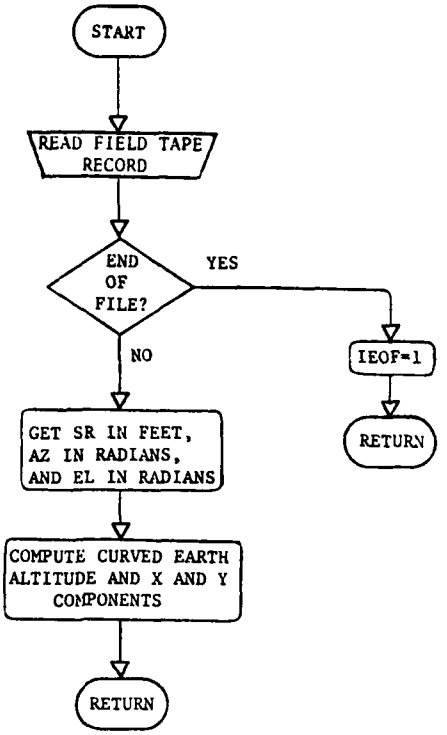
FLOWCHART FOR SUBROUTINE REAVG - 17.1



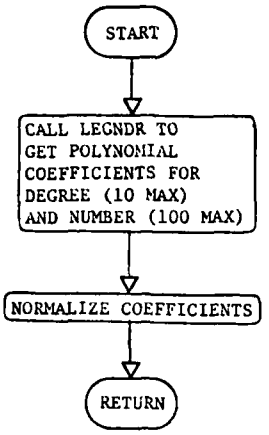
FLOWCHART FOR SUBROUTINE REAVGT - 18.1



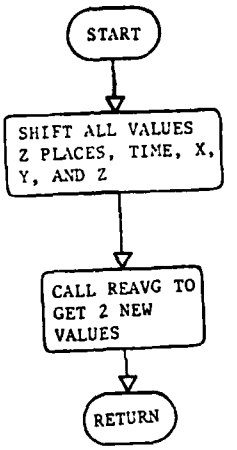
FLOWCHART FOR SUBROUTINE RTDATA - 14.1



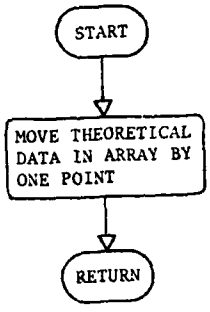
FLOWCHART FOR SUBROUTINE SINGLE - 19.1



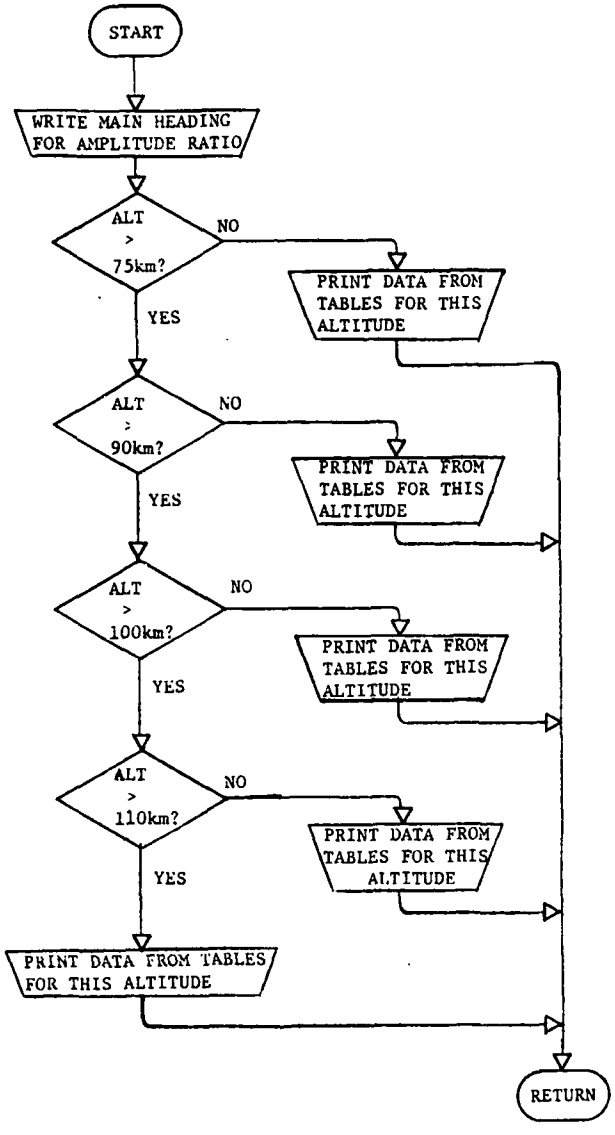
FLOWCHART FOR SUBROUTINE SLIDE - 20.1



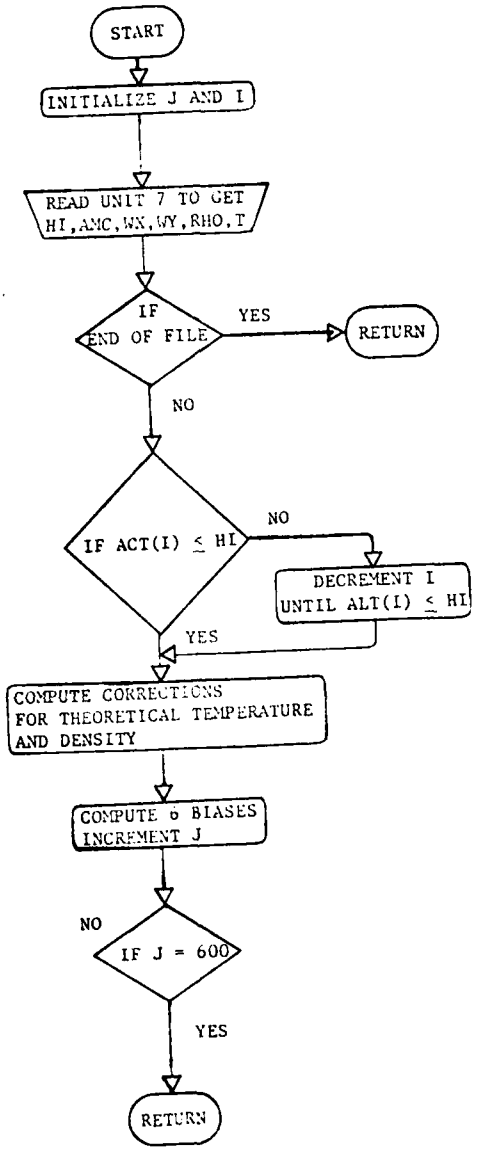
FLOWCHART FOR SUBROUTINE SLIDEI - 21.1



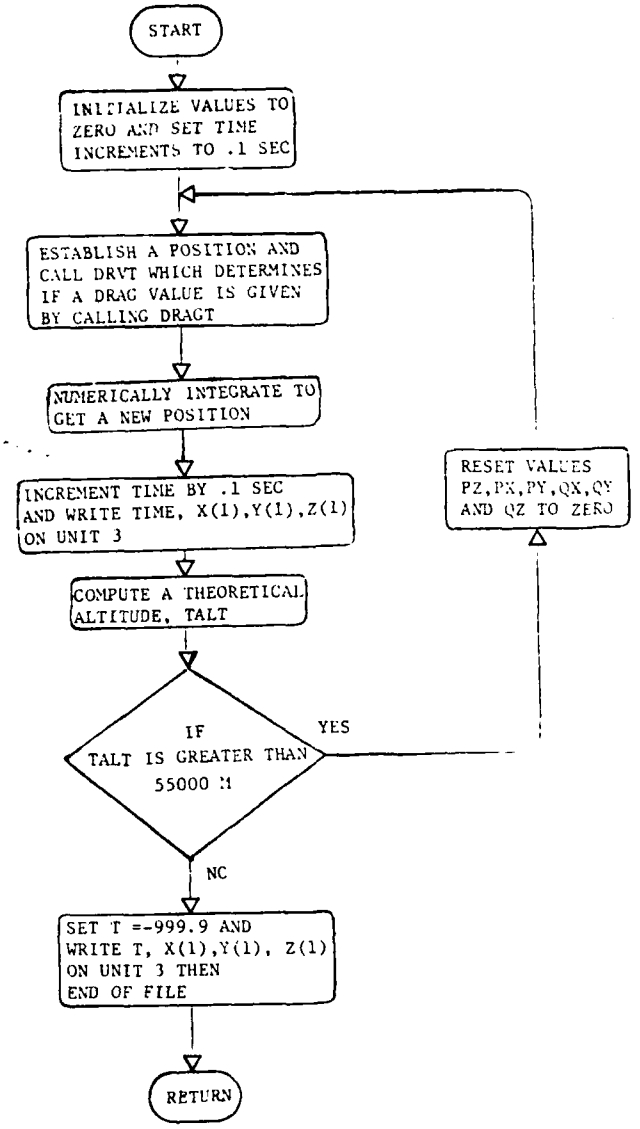
FLOWCHART FOR SUBROUTINE TAB - 22.1



FLOWCHART FOR SUBROUTINE TABLE - 23.1



FLOWCHART FOR SUBROUTINE THEOT - 24.1

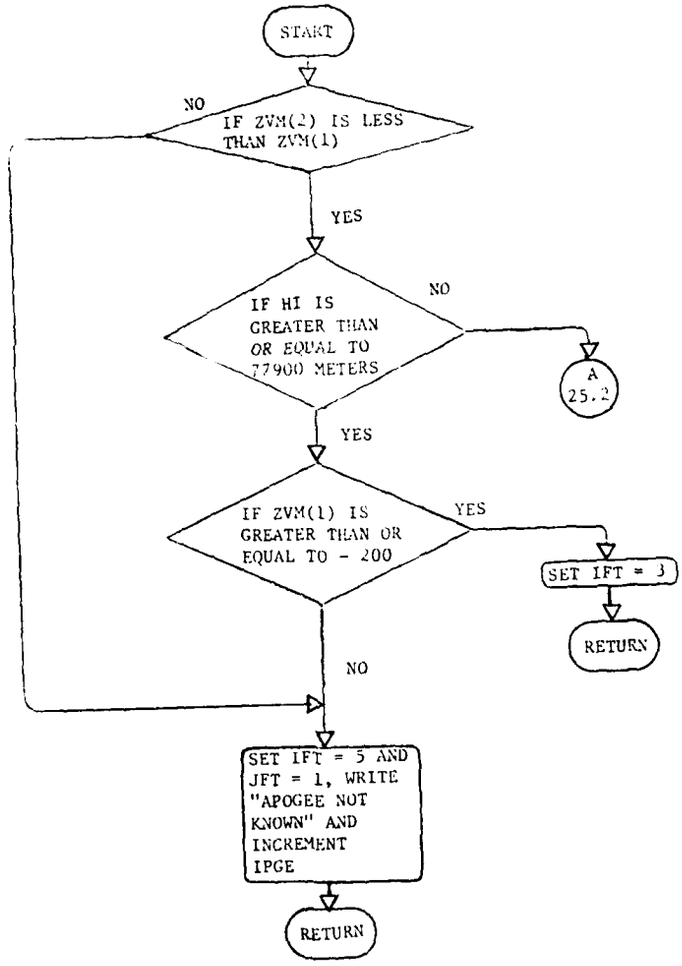


FLOWCHART FOR SUBROUTINE TIFALL - 25.1

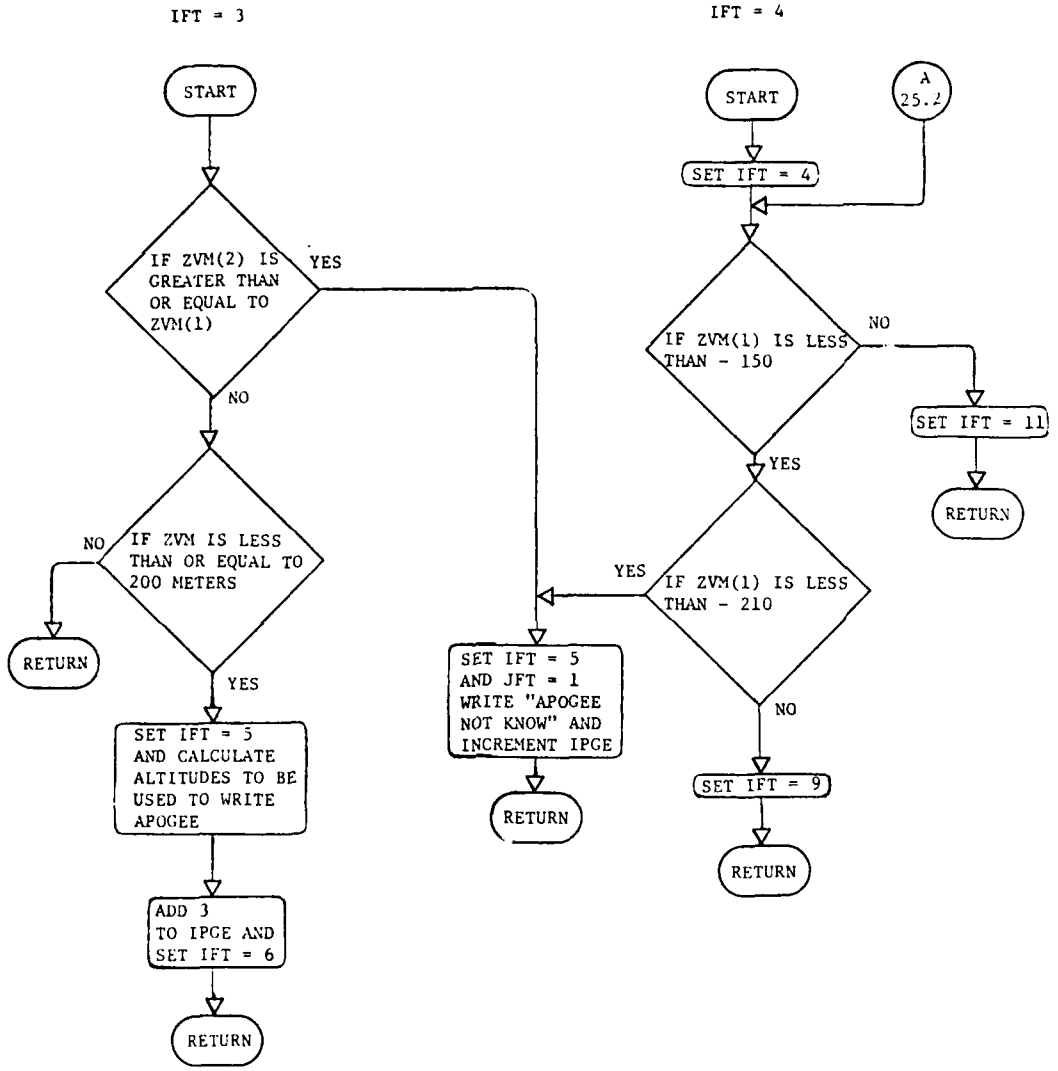
Tifall is dependent on IFT as to where in the subroutine it will return to. The first statement is a computed GO TO statement with eleven possible choices.

If IFT = 1, return immediately.

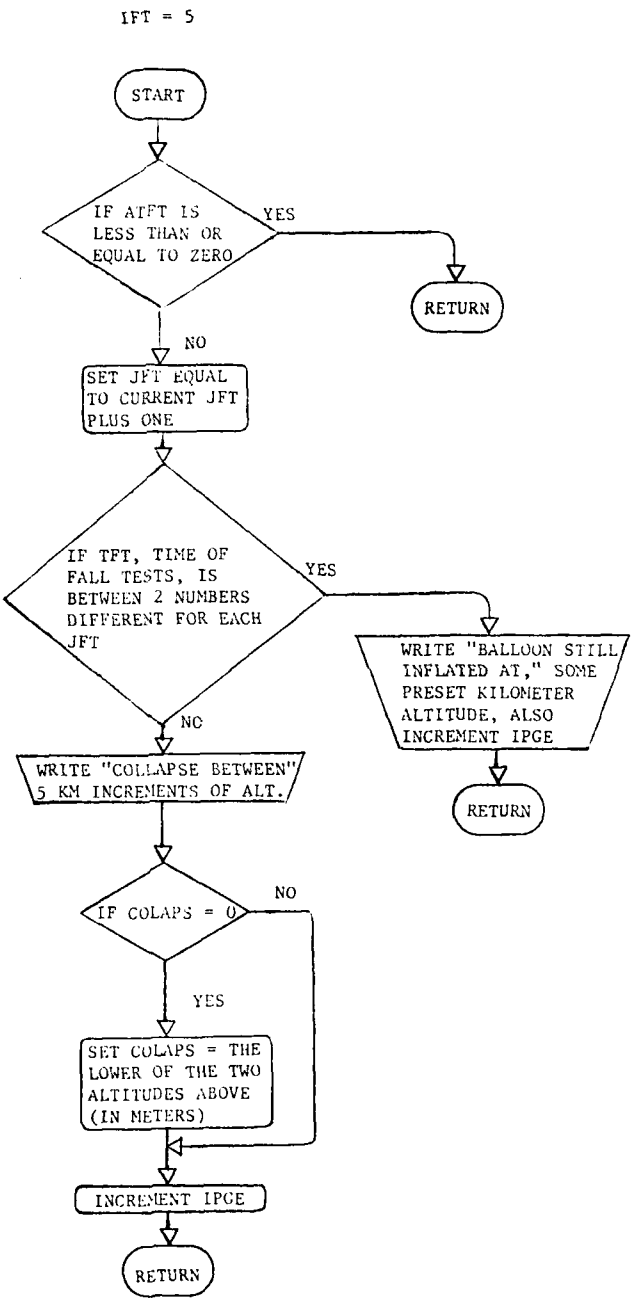
IFT = 2



FLOWCHART FOR SUBROUTINE TIFALL - 25.2

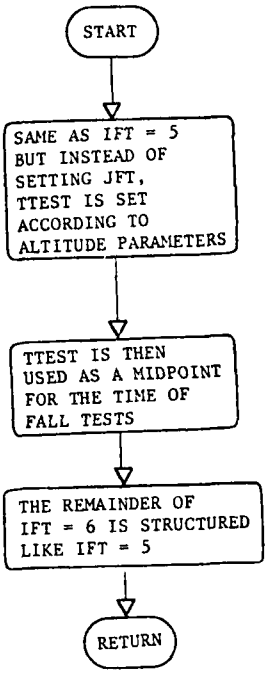


FLOWCHART FOR SUBROUTINE TIFALL - 25.3



FLOWCHART FOR SUBROUTINE TIFALL - 25.4

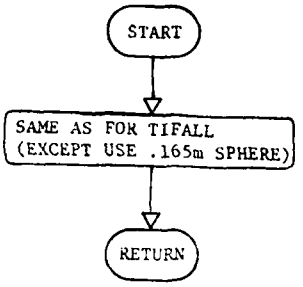
IFT = 6



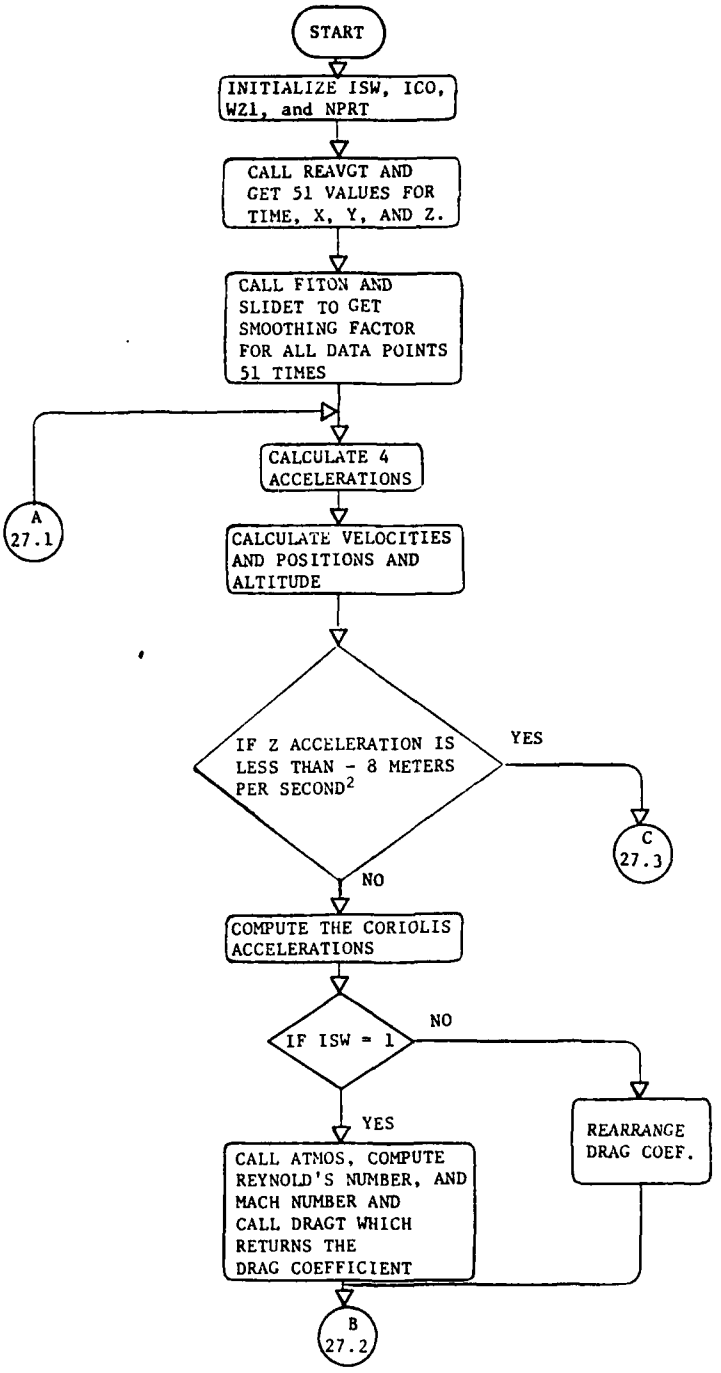
IFT = 7, IFT = 8, AND IFT = 10 ARE SIMILAR TO IFT = 5.

IFT = 9 AND IFT = 11 ARE STRUCTURED THE SAME AS IFT = 3, BUT THEY HAVE NUMERICAL DIFFERENCES

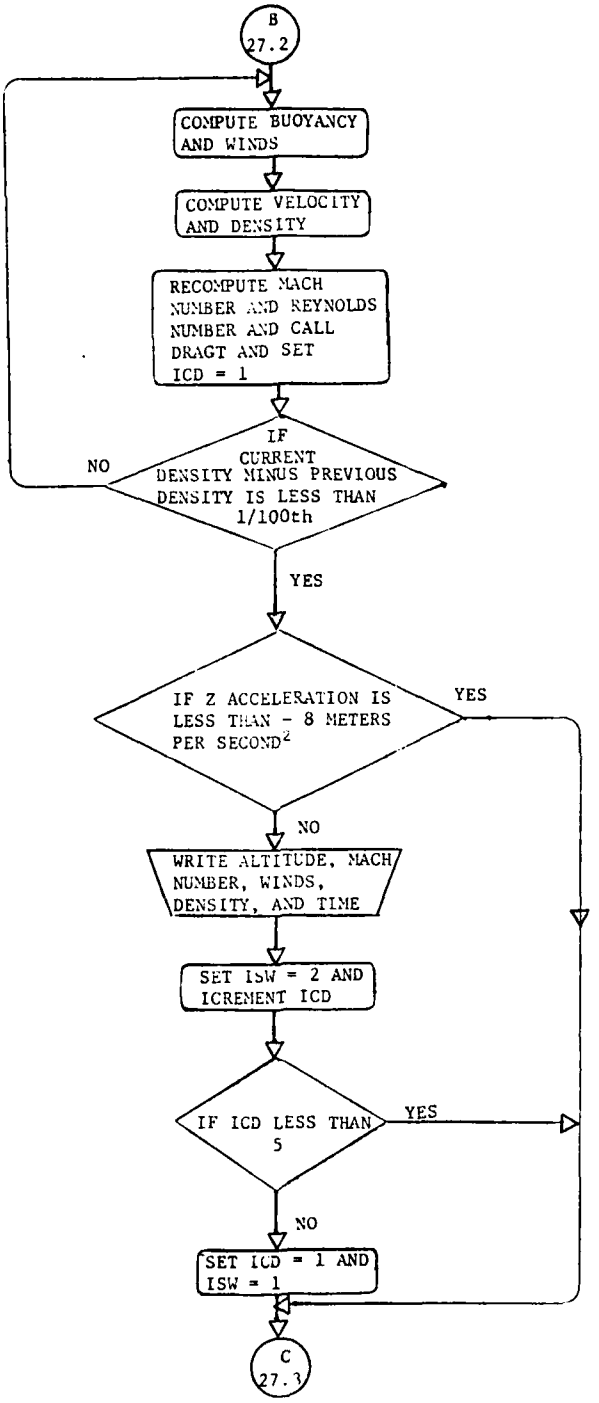
FLOWCHART FOR SUBROUTINE TIFAL2 - 26.1



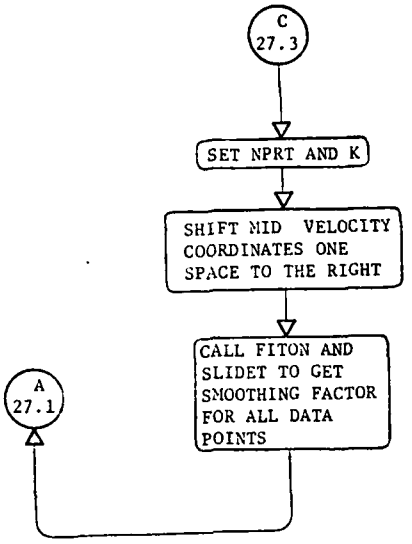
FLOWCHART FOR SUBROUTINE TROBIN - 27.1



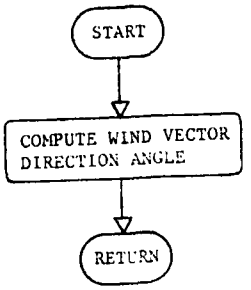
FLOWCHART FOR SUBROUTINE TROBIN - 27.2



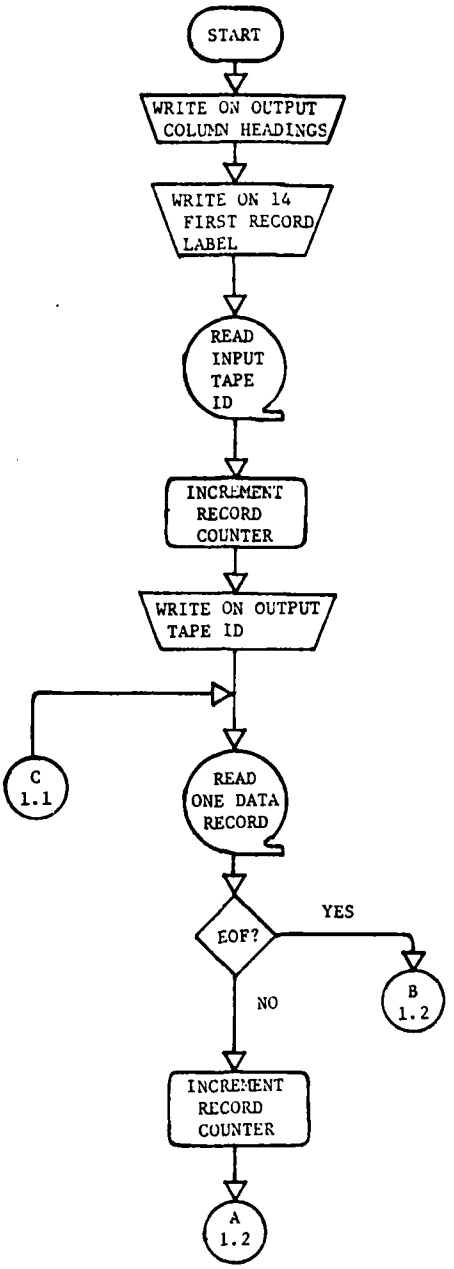
FLOWCHART FOR SUBROUTINE TROBIN - 27.3



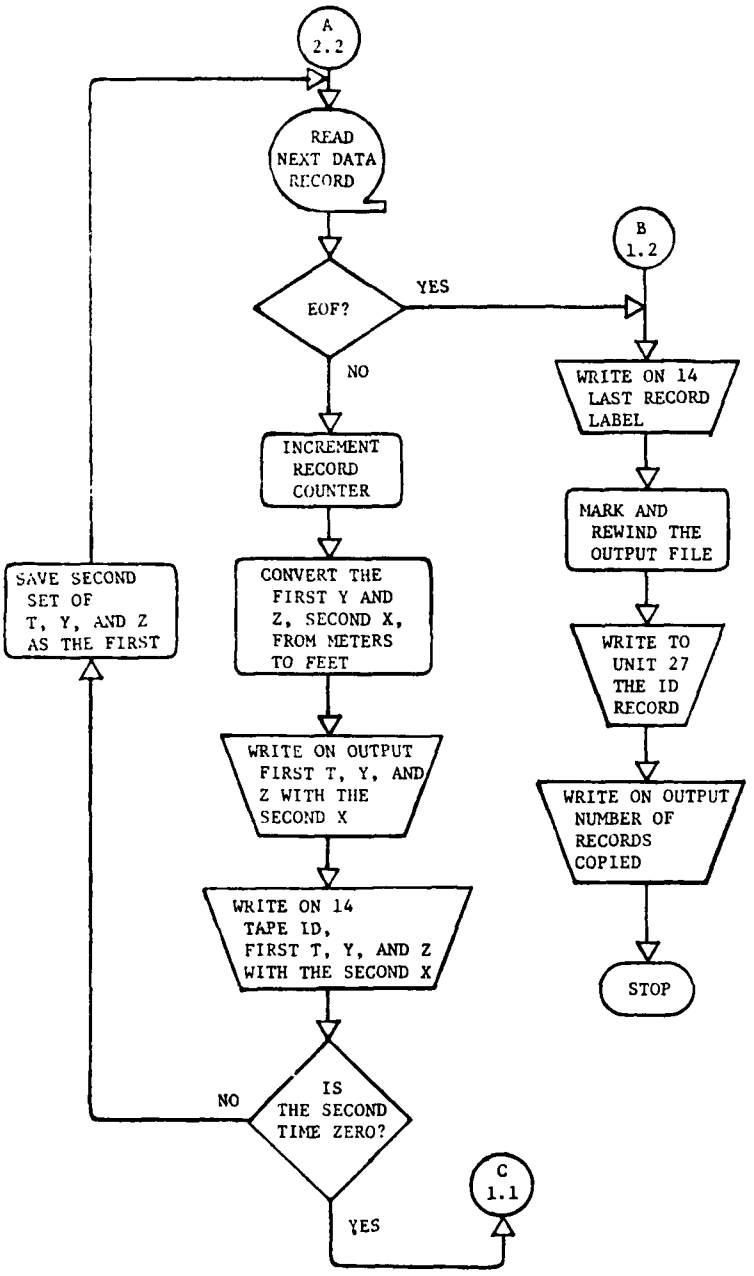
FLOWCHART FOR SUBROUTINE WANGL - 28.1



FLOWCHART FOR MAIN PROGRAM PHR - E1.1

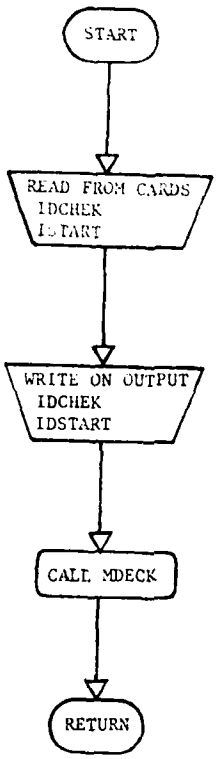


FLOWCHART FOR MAIN PROGRAM PMR - E1.2

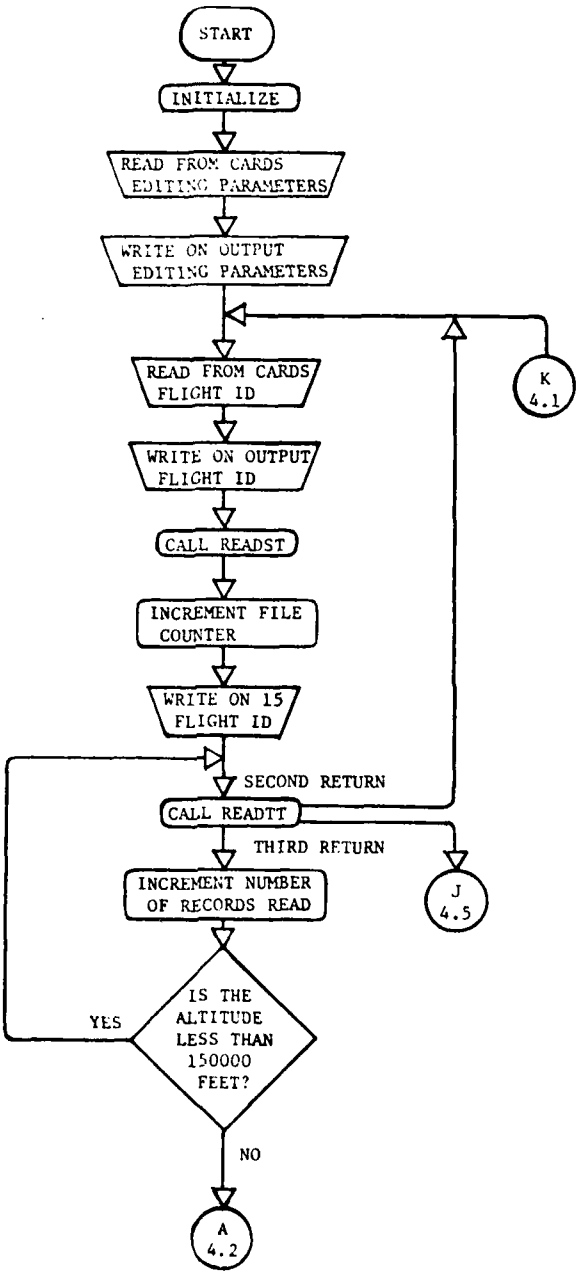


FLOWCHART FOR MAIN PROGRAM AØ - E2.1

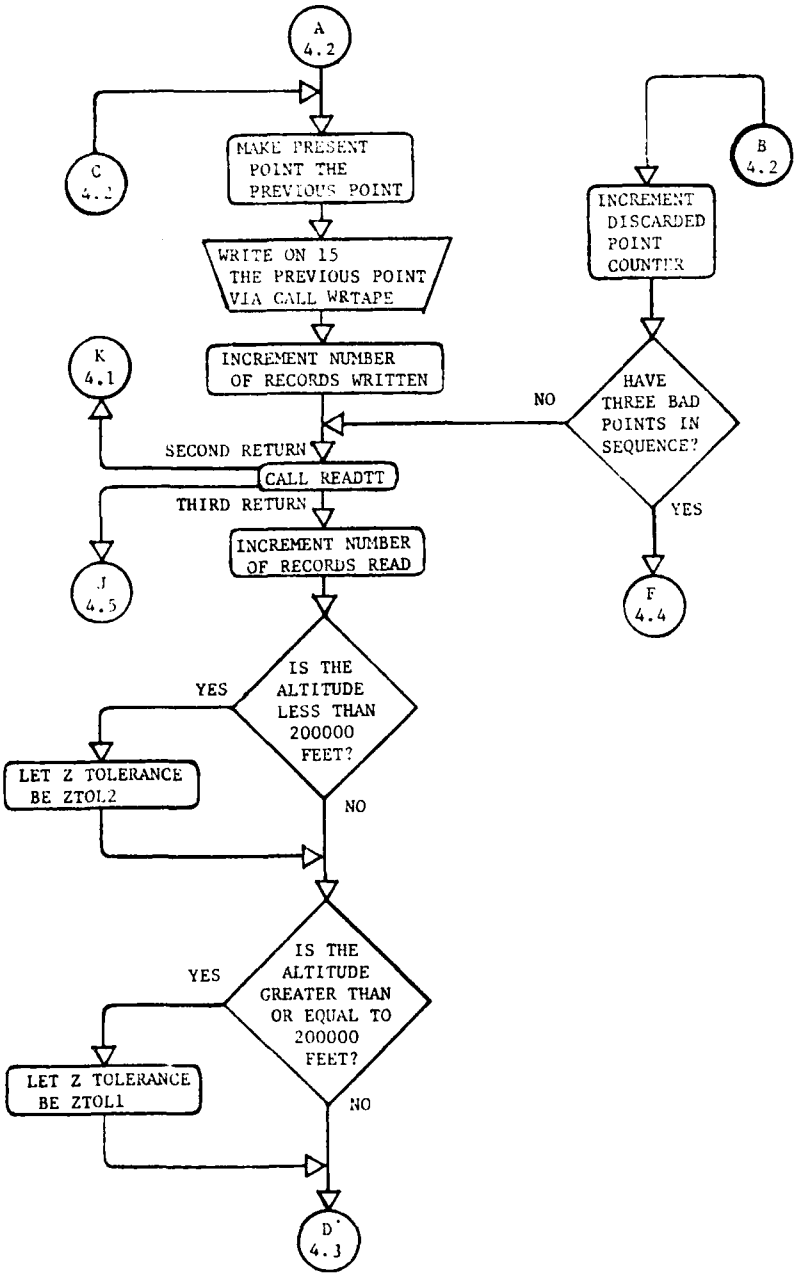
FLOWCHART FOR SUBROUTINE MAIN - E3.1



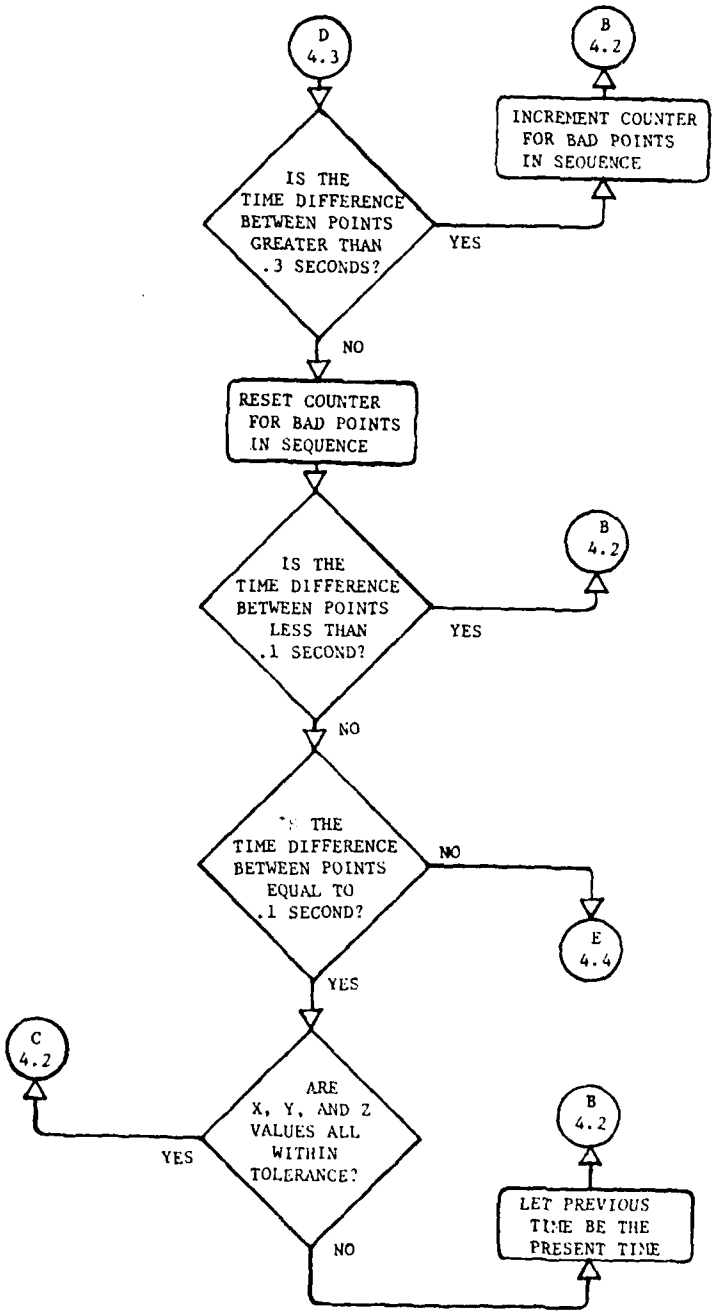
FLOWCHART FOR SUBROUTINE MDECK - E4.1



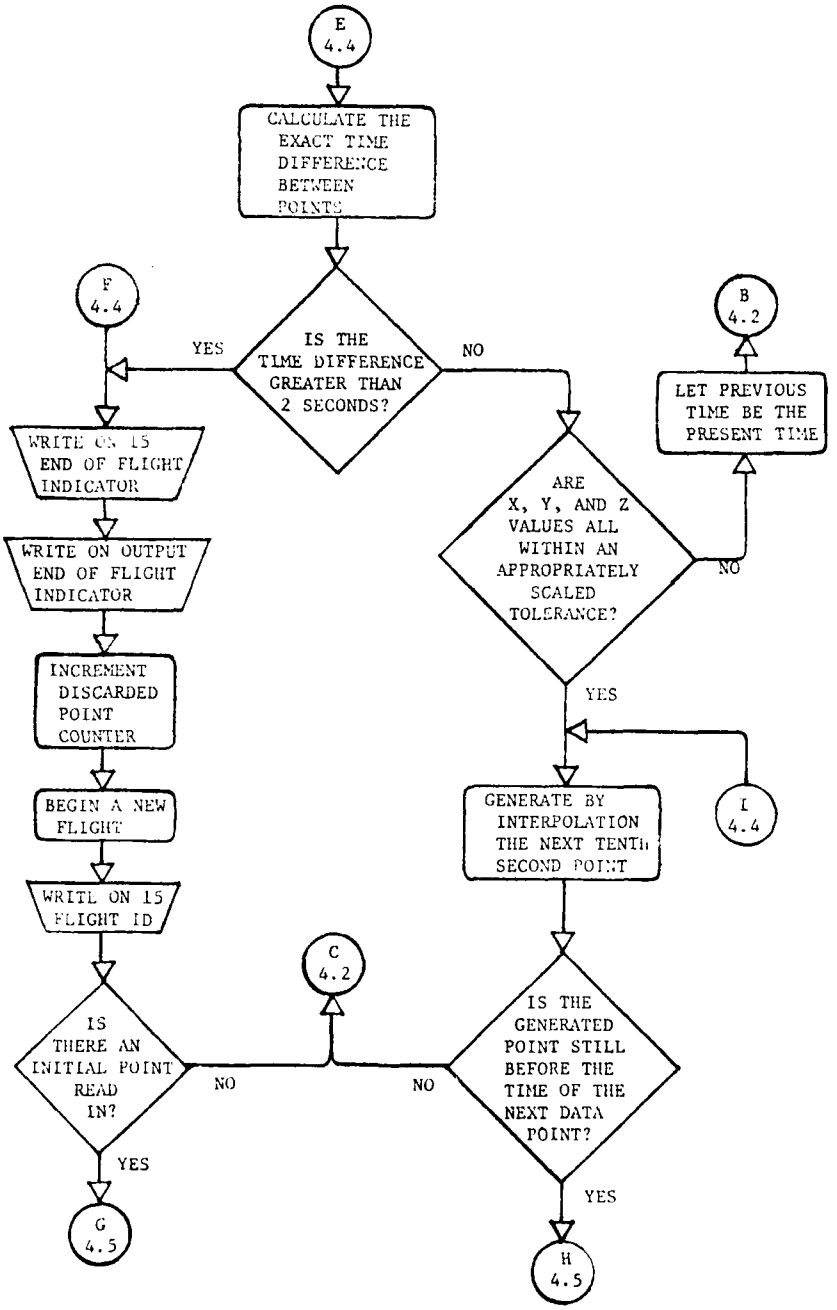
FLOWCHART FOR SUBROUTINE MDECK - E4.2



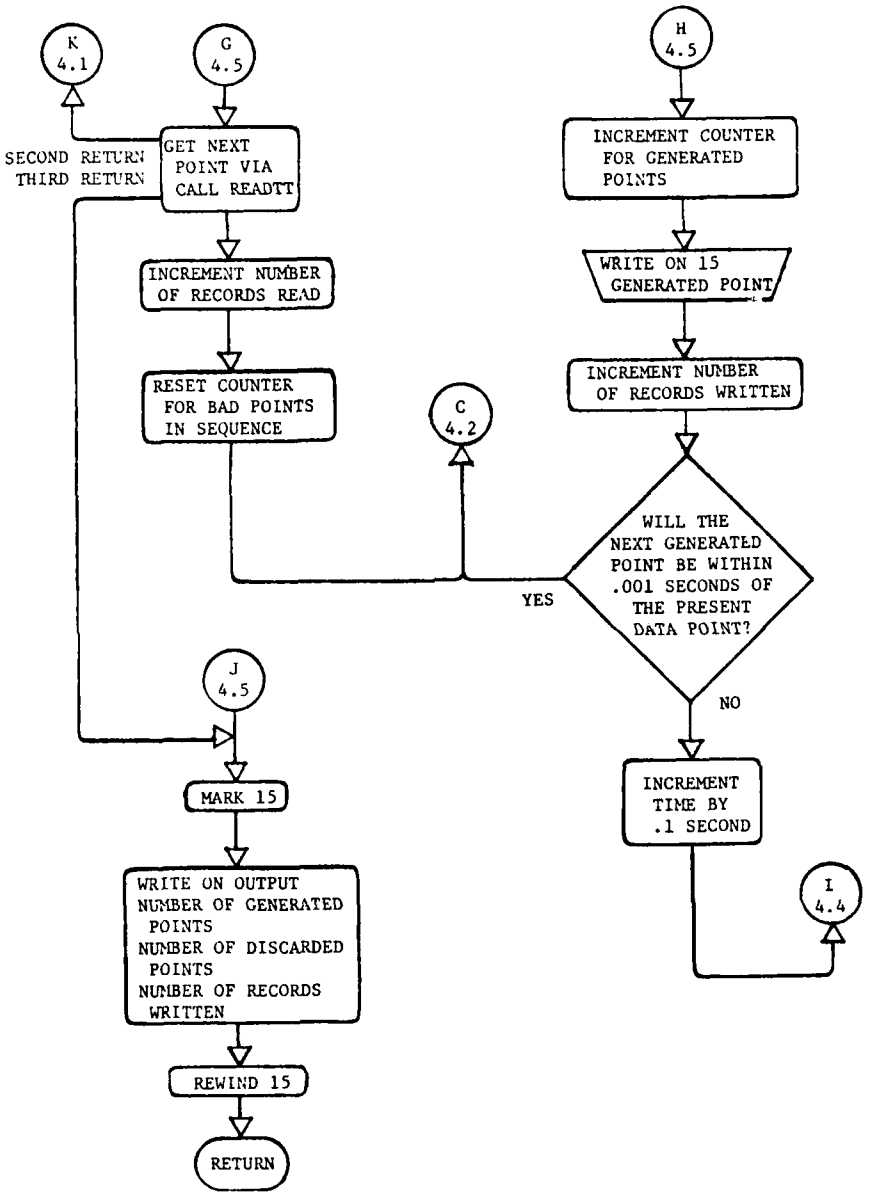
FLOWCHART FOR SUBROUTINE MDECK - E4.3



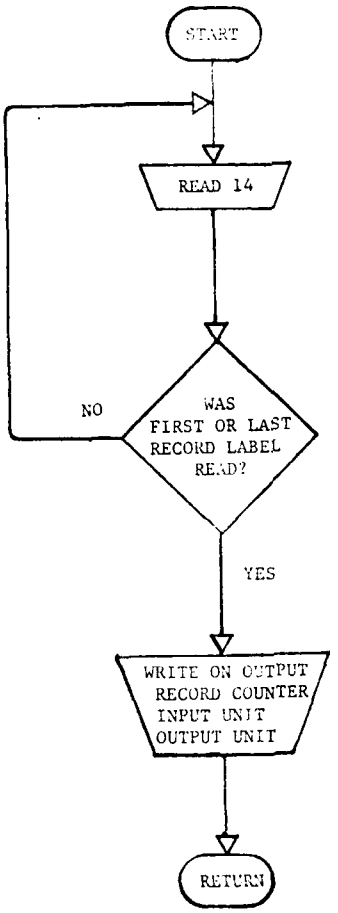
FLOWCHART FOR SUBROUTINE MDECK - E4.4



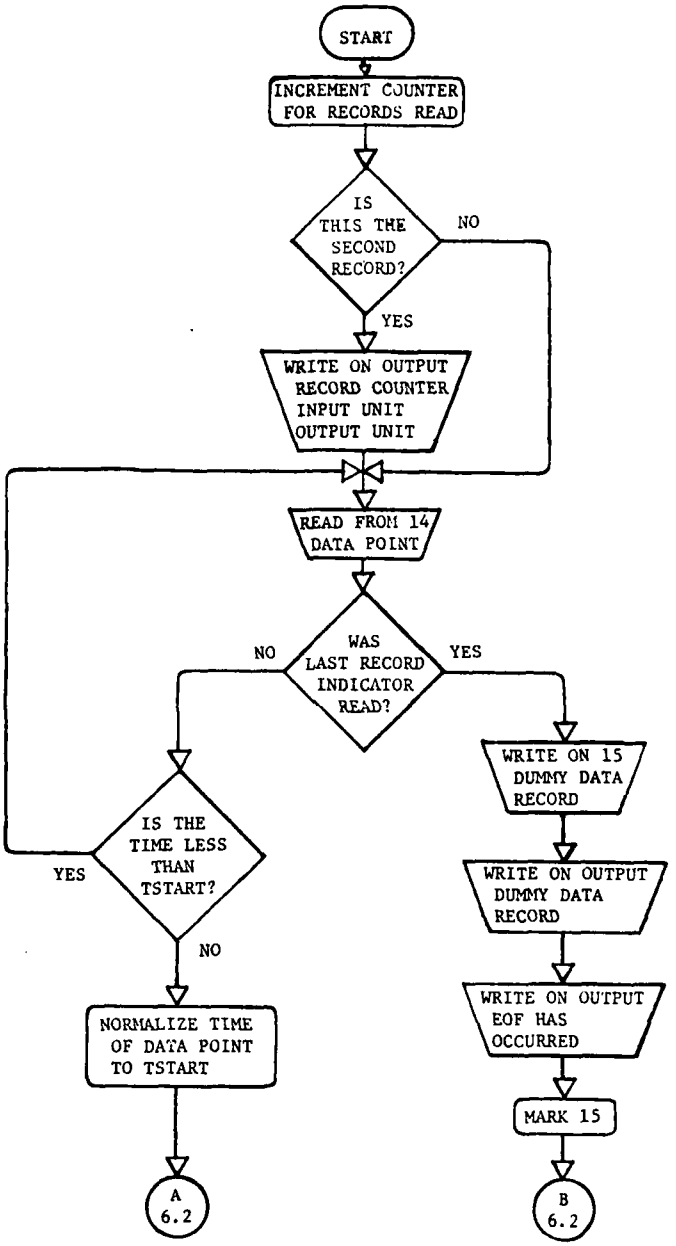
FLOWCHART FOR SUBROUTINE MDECK - E4.5



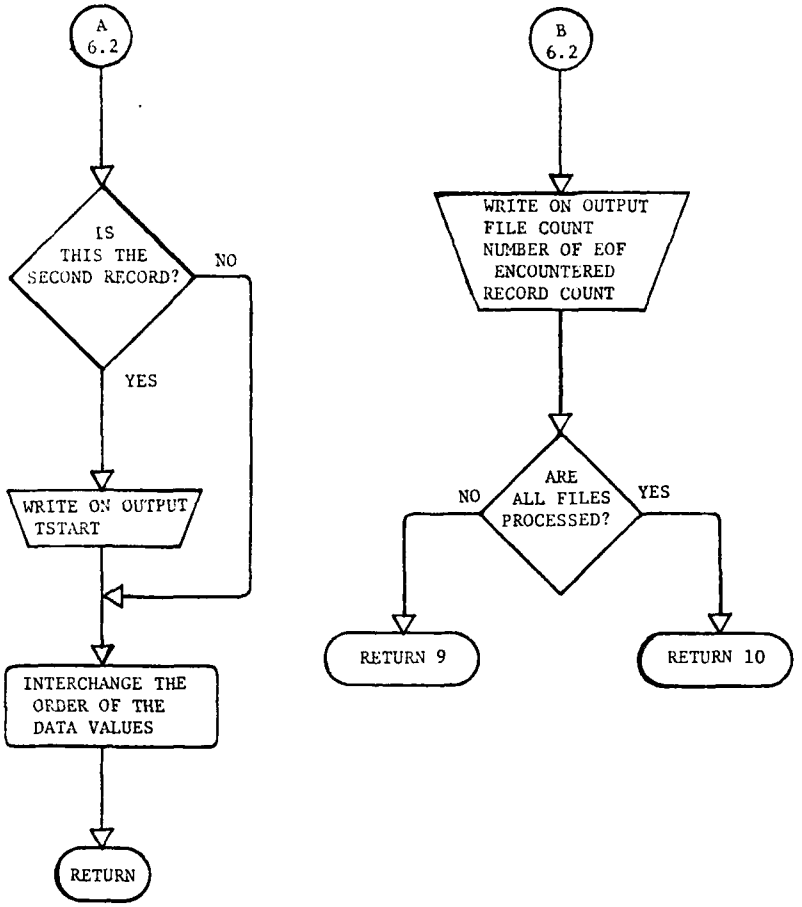
FLOWCHART FOR SUBROUTINE READST - E5.1



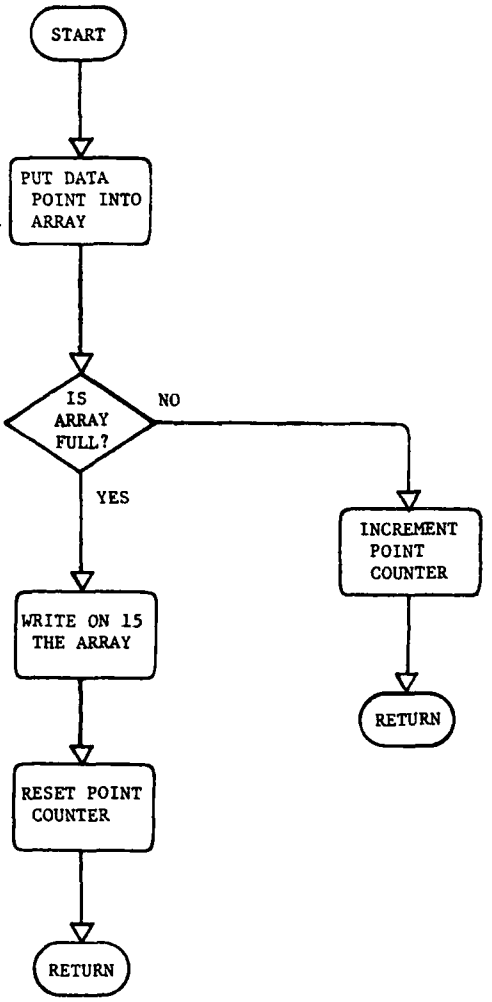
FLOWCHART FOR SUBROUTINE READTT - E6.1



FLOWCHART FOR SUBROUTINE READTT - E6.2



FLOWCHART FOR SUBROUTINE WRTAPE - E7.1



V. PROGRAM LISTING FOR INTERDATA COMPUTER

```
$ASSM
            PPAUS
ROBIN       PROG  RIGID SPHERE TRAJ   30 NOV 79 R01  S REM3:ROBIN.FOR
            CROSS
            NORX3
            NLSTC
            NLIST
$FORT
      REAL NA
      DOUBLE PRECISION DX1,DY1,DZ1,DRG,DHMSL,DHI
      INTEGER*2 IFLAG,IFLAG1,IFLAGX,IFLAGS,TP,DN,IMX,JMX,IP1
      INTEGER*2 IDEGX1,IDEGX2,IDEG71,IDEG72,N2MID
      INTEGER*2 NXY2,NZ2,NX1MID,NX2MID,N71MID,NZ2MID,N2ST
      INTEGER*2 IX,J,N,MIDMAX,KMAX1,KMAX2,N1ST,NXY1,NZ1
      INTEGER*2 IBC,IBCA,IBCM,IFLAGB,ID,IY,I,IDD,INTERP,ICNT,NPRT
      INTEGER*2 ICD,IPGE,IBAL,IFT,ISN,IM1,IHR,JS1T,K,KSW,KSW2,NEND
C
      COMMON /TF/TFT1,TFT2,TFT3,TFT4,TFT5,TFT6,TFT7,TFT8,TFT9,TFT0
      COMMON /D/X1,X2,X3,Y1,Y2,Y3,Z1,Z2,Z2X,Z3,Z3X,CONX1,CONX2,CONX3,
     X CONX4,CONZ1,CONZ2,CONZ3,CONZ4,GS,IDEGX2,IDEGX1,IDEG72,IDEG71
     X,N2MID
      COMMON /TABL/ IMX,BIASHI(600),BIASNX(600),BIASWY(600),BIASR(600),
     X  BIAST(600),JMX,BIASMC(600)
      COMMON /CONST/RG,ALA,HMSL,AMS,ZB,DIA,VB,AM,GSRG,AB
      COMMON /EXTRA/ NXY2,NZ2,NX1MID,NX2MID,NZ1MID,NZ2MID,N2ST
      COMMON /COEF/ PXY1(51),PXY2(35),PZ2(21),PZ1(51)
      COMMON /CORI2/ TOSL,TOCL,TOCLSZ,TOCLCZ
      COMMON /CON2/ AMK,ALPHA,RU,RAD
      COMMON /INT/ IH,HI,AMC,WF,WN,WT,THETA,PICOR,RHOCOR,
     X TCOR,CD,RE,VRHO,VWX,VWY,PIMB,VP,VT,INTAI T,ITIM,CFREQ,TND1,TND2
      COMMON TIME(100),X(100),Y(100),Z(100),TMID(50),XMID(50),YMID(50),
     X ZMID(50),XVM(50),YVM(50),ZVM(50),IX,J,N,MIDMAX,KMAX1,KMAX2,
     X C1,N1ST,NXY1,NZ1,ZXM(50)
C
      DIMENSION CP1(100),CA1(100),ANAME(20)
C
      DATA ANAME/80H7-32 TEST OF ROBIN BENCHMARK DATA
     X                                              /
C
  102 FORMAT(I10,2I2,F6.2,21X,F7.1,F6.1,F7.4,F8.5,I3)
  324 FORMAT(1H0,20A4)
  325 FORMAT(68H0 ID RD WR ALA        GS        RG       HMSL     ZB    AMS
     *     DIA    INT/1H ,I4,2I2,F6.2,F11.6,F10.1,F7.1,F6.1,F7.4,F8
     *.5,I3)
  329 FORMAT(20A4)
  400 FORMAT(1H ,95X,27H***R.M.S. NOISE ERROR IN***/3X,119HTIME     ALT .
     * EWIND NWIND  SPEED DIR   PRESS    T    DENSITY  Z VEL  Z ACC     TDE
     *N        CF     DENS  PRES  TEMP  EW    NW/3X,120HZULU    METERS  M/S
     *   M/S    M/S  DEG    MR     K    GR/M3    M/S   M/S2       /CC   .
     *   /S    *****PERCENT*****  M/S  M/S    )
```

```
      401 FORMAT(1H1,95X,27H***R.M.S. NOISE ERROR IN***/3X,119HTIME     ALT .
     * EWIND NNIND  SPEED DIR   PRESS   T   DENSITY  Z VEL.  Z ACC     TDE
     *N        CF      DENS  PRFS  TEMP  EW   NN/3X,120HZULU   METERS  M/S
     *   M/S    M/S  DEG    MB     K    GR/M3    M/S   M/S2       /CC    .
     *   /S    *****PERCENT*****  M/S  M/S   )
      403 FORMAT(1X,I2,2(1H.,I2),I7,2F6.1,F7.2,2(I4,F9.5),F8.2,F6.2,2(1X,E9
     *.4),3F6.1,2F5.1)
C
C
      IX=5
      IY=3
      WRITE(IY,479)
      479 FORMAT(47H1JNIVERSITY OF DAYTON ROBIN PROGRAM - SEPT 1977 //)
      NZ1=19
      CALL LINEAR(NZ1)
      IBC=2
      IBCA=2
      IBCM=2
      IFLAGB=0
      ISW=1
      RE=0.
      PICOR=0.
      RHOMGS=0.
      TCOR=0.
      TND2=0.
      PI=0.
      ZVC=0.
      COLAPS=0.0
      NZ1MID=10
      N1ST=17
      NX1MID=26
      NX2MID=18
      NZ2MID=11
      KMAX2=35
      KMAX1=51
      MIDMAX=26
      N2MID=18
      N2ST=8
      C2=1.
      NXY1=51
      NXY2=35
      NZ2=21
      IDEGX1=3
      IDEGX2=3
      IDEGZ1=1
      IDEGZ2=3
     1011 FORMAT(1H0,12X,30HXY-VEL.  XY-ACC   Z-VEL.   Z-ACC/
     A11H = PTS. FIT,4I8/
     B11H DEGREE FIT,4I8)
C      THE FOLLOWING READS ARE REPLACED BY EQUALITY STATEMENTS
```

```
101     C    2 READ(5,329)ANAME
102     C      READ(5,102)ID, IX, IY, ALA, HMSL, ZB, AMS, DIA, INTERP
103            ID=2377
104            ALA= 32.46
105            HMSL=1220.
106            ZB=0.
107            AMS = 1649
108            DIA= 1.
109            INTERP=1
110            RAD=57.2957795
111            RG= 6.371 E9 *10
112     C      GS=-9 *6674*(1.0+5.2885E-3*(SIN(ALA/RAD)**2)-5.9E-8*(SIN(2.*ALA/
113            GS=-9 *9750*
114     C     X   RAD)**2))
115            WRITE(IY,324)ANAME
116            WRITE(IY,1011)NXY1,NXY2,NZ1,NZ2,IDEGX1,IDEGX2,IDEGZ1,IDEGZ2
117            WRITE(IY,325)ID, IX, IY, ALA, GS, RG, HMSL, ZB, AMS, DIA, INTERP
118      3001 FORMAT(4I*0)
119            ICNT=25
120     C 220 READ(*,* IDD
121       220 IDD=2377
122           IF(IDD-ID) 222,225,222
123       222 JSTT=1
124           IF(ISTT.EQ.1) STOP
125           GO TO 220
126       225 VB=(0.52*325)*DIA*DIA*DIA
127           AB=(0.39269908)*DIA*DIA
128           ESALT=0.0
129           ICD=3
130           AMX= 0.028366
131           ALPHA =-0.0001523
132           RU= 8.31437
133           PTN= 0.0792E+16
134           NA= 6.0221E+23
135           RSTAR=8.31432
136           WZ1=0.0
137           NPPT=0
138           PIMB=0.0
139           CZB=COS (ZB/RAD)
140           SZB= SIN (ZB/RAD)
141           TOSL= 0.0001458*SIN(ALA/RAD)
142           TOCL= 0.0001458*COS(ALA/RAD)
143           TOCLS2=TOCL*SZB
144           TOCLC2= TOCL*CZB
145           IPGF=12
146           DEL=.25
147           AN1=NXY1
148           CONX1=12./(DEL*AN1*(AN1*AN1-1.))
149           CONX2=CONX1+7.*(3.*AN1*AN1-7.)**2/(DEL*AN1*(AN1*AN1-1.)
150          1*(AN1*AN1-4.)*(AN1*AN1-9.))
```

```
151           AN1=NZ1
152           CONZ1=12. /(DEL*AN1*(AN1*AN1-1. ))
153           CONZ2=CONZ1+7. *(3. *AN1*AN1-7. )**2/(DEL*AN1*(AN1*AN1-1. )
154          1*(AN1*AN1-4. )*(AN1*AN1-9. ))
155           AN1=NXY2
156           DEL=1.
157           CONX3=12. /(DEL*AN1*(AN1*AN1-1. ))
158           CONX4=CONX3+7. *(3. *AN1*AN1-7. )**2/(DEL*AN1*(AN1*AN1-1. )
159          1*(AN1*AN1-4. )*(AN1*AN1-9. ))
160           AN1=NZ2
161           CONZ3=12. /(DEL*AN1*(AN1*AN1-1. ))
162           CONZ4=CONZ3+7. *(3. *AN1*AN1-7. )**2/(DEL*AN1*(AN1*AN1-1. )
163          1*(AN1*AN1-4. )*(AN1*AN1-9. ))
164           CALL CORRS(NXY1, PXY1, NXY2, PXY2, RMSN, 2)
165           CALL CORRS(NZ1, PZ1, NZ2, PZ2, RMSD, 2)
166           CONX3=CONX3+RMSN
167           CONX4=CONX4+RMSN
168           CONZ3=CONZ3+RMSD
169           CONZ4=CONZ4+RMSD
170           VP=0. 0
171           TFT=0.
172           TFT1=0.
173           TFT2=0.
174           TFT3=0.
175           TFT4=0.
176           TFT5=0.
177           TFT6=0. 0
178           TFT7=0. 0
179           TFT8=0. 0
180           TFT9=0. 0
181           TFT0=0. 0
182           IF(ABS(DIA-1. ). LT. 0. 02. AND. ABS(AMS-. 115). LT. 0. 01) GO TO 300
183           IBAL=1
184           IF(ABS(DIA-1. ). LT. 0. 02. AND. ABS(AMS-. 165). LT. 0. 01) GO TO 299
185           WRITE(IY, 410)
186       410 FORMAT(20X, 46HBALLOON NOT ROBIN.   TIME OF FALL TEST NOT USED  )
187           IPGF=IPGE+1
188           IFT=1
189           GO TO 230
190       299 IBAL=2
191       300 IFT=2
192       230 CALL DECALT(ICNT, IFLAG1)
193           IF(IFLAG1)301, 35, 90
194       301 WRITE(IY, 400)
195           IPGE=IPGF+3
196           INTALT=0
197      1001 DO 52 J=1, KMAX1
198        52 CALL REAVG(ICNT, IFLAG3)
199           IF(IFLAG3)1003, 40, 90
200      1003 IF(KMAX1. NE. NXY1) GO TO 3
```

```
      KSN2=1
      GO TO 4
    3 KSN2=2
    4 IF(KMAX2.EQ.NXY2) GO TO 5
      KSN=2
      GO TO 6
    5 KSN=1
    6 IF(IFLAGB.EQ.0) CALL CONTRI(GS,N2MID,KSN2,KSN,IPGE,IY)
      IFLAGB=1
      GOTO(7,9),KSN2
    7 L=8*(KMAX2-1)
      N=K
      CALL FITON
      CALL SLIDE(2,ICNT,IFLAG5)
      IF(IFLAG5)8,40,90
    8 CONTINUE
      GO TO 11
    9 DO 10 K=1,KMAX2
      N=K
      CALL FITON2
      CALL SLIDE(2,ICNT,IFLAG5)
      IF(IFLAG5)10,40,90
   10 CONTINUE
   11 Z3=0.0
      Y=0.0
      Z2=0.0
      GO TO (12,15),KSN
   12 DO 13 I=1,NXY2
      Z3=Z3X+PXY2(I)*ZXM(I)
      Y=Y+PXY2(I)*XVM(I)
   13 Z2=Z2+PXY2(I)*YVM(I)
      IF(NO.N2ST+NZ2-1
      DO 14 I=N2ST,NEND
      K=I-N2ST+1
   14 Z3=Z3+PZ2(K)*ZVM(I)
      GO TO 18
   15 DO 16 I=1,NZ2
   16 Z3=Z3+Z2(I)*ZVM(I)
      NEND=NXY2+N2ST-1
      DO 17 I=N2ST,NEND
      K=I-N2ST+1
      Z3X=Z3X+PXY2(K)*ZXM(I)
      X3=X3+PXY2(K)*XVM(I)
   17 Y3=Y3+PXY2(K)*YVM(I)
   18 X3=X3+C2
      Y3=Y3+C2
      Z3X=Z3X+C2
      Z3=Z3+C2
      Y2=YVM(N2MID)
```

```
      Y2=YVM(N2MID)
      Z2X=ZXM(N2MID)
      Z2=ZVM(N2MID)
      X1=XMID(N2MID)
      Y1=YMID(N2MID)
      Z1=ZMID(N2MID)
      TIM=TMID(N2MID)
      HI=Z1+(X1*X1+Y1*Y1)/(2. *RG)+HMSL
      IH=HI
      ENDHI=ZMID(1)+(XMID(1)**2+YMID(1)**2)/(2. *RG)+HMSL
      OPHOR=1. 0+HI/RG
      WTHR=GS/(RG*OPHOR*OPHOR*OPHOR)
      IF(TFT6. EQ. 0. 0. AND. HI. LT. 60000. ) TFT6=TIM
      IF(TFT1. NE. 0. . OR.     HI. GT. 80000. ) GO TO 500
      TFT1=TIM
  500 IF(TFT2. NE. 0. . OR.     HI. GT. 70000. ) GO TO 501
      TFT2=TIM
      TFT=TFT2-TFT1
  501 IF(TFT3. NE. 0. . OR.     HI. GT. 60000. ) GO TO 502
      TFT3=TIM
      TFT=TFT3-TFT2
  502 IF(TFT4. NE. 0. . OR.     HI. GT. 55000. ) GO TO 503
      TFT4=TIM
      TFT=TFT4-TFT3
  503 IF(TFT5. NE. 0. 0. OR. HI. GT. 50000. ) GO TO 505
      TFT5=TIM
      TFT=TFT5-TFT4
  505 IF(TFT7. NE. 0. 0. OR. HI. GT. 45000. ) GO TO 506
      TFT7=TIM
      TFT=TFT7-TFT5
  506 IF(TFT8. NE. 0. 0. OR. HI. GT. 40000. ) GO TO 507
      TFT8=TIM
      TFT=TFT8-TFT7
  507 IF(TFT9. NE. 0. 0. OR. HI. GT. 35000. ) GO TO 508
      TFT9=TIM
      TFT=TFT9-TFT8
  508 IF(TFT0. NE. 0. 0. OR. HI. GT. 30000. ) GO TO 504
      TFT0=TIM
      TFT=TFT0-TFT9
  504 IF(IBAI. EQ. 1) GO TO 509
      CALL TIFAI2(ENDHI, TFT, IFT, ZVM, ESALT, COLAPS, IPGE, IY)
      GO TO 510
  509 CALL TIFAI1(ENDHI, TFT, IFT, ZVM, ESALT, COLAPS, IPGE, IY)
  510 TFT=0.
      IF(HI. GT. BIASHI(1)) GO TO 39
      ENDLO=ZMID(KMAX2)+(XMID(KMAX2)**2+YMID(KMAX2)**2)/(2. *RG)+HMSL
      CORX=TOCLSZ*Z2X+TOSL*Y2
      CORY=TOCLCZ*Z2X-TOSL*X2
      COR2=-TOCLSZ*X2-TOCLCZ*Y2
      GO TO (19, 38), ISW
```

```
   19 CALL ATMOS(HI,T,RHOO)
      [illegible]
      VT=ABS(Z2)*SQRT(1.0+(X3*X3+Y3*Y3)/(Z3-WTHR*(Z1+RG))**2)
      RE=DIA*RHOO*VT*(T+110.4)/(0.000001458*SQRT(T*T*T))
      AMC=VT*(SQRT(288.16/T))/340.29205
      CALL DRAGT(CD,AMC,RE,IFLAG)
      IF(IFLAG)511,2000,511
  511 [illegible]
      [illegible]
      [illegible] RHOO
      [illegible]
      [illegible]
      [illegible]CD-CD[illegible]
      [illegible]
      [illegible] GT .0000[illegible] GO TO 20
      [illegible] ABS(ZVM(1)/ZVM(NZ2)))/(ZMID(1)-ZMID(NZ2))+2.0
      [illegible]ZMID(1)-ZMID(NZ2))**2
      [illegible]0004-SQRT(.25E-9+.00719782/DELZ)
      [illegible].0001 +SQRT(.25E-8+.00719782/DELZ)
   5[illegible] IF([illegible].LT.[illegible]) GO TO 42
      [illegible] .GT. [illegible]) GO TO 20
   4[illegible] [illegible](IY,405)
  405 FORMAT([illegible]39HDENSITY GRADIENT EXCEEDS NOMINAL VALUE )
      [illegible]+1
      IF(COLAPS .EQ. 0.) COLAPS=IH
   20 WTWO=(1.0-VB*RHO/AMS)*WTHR
      [illegible] X1*WTWO
      [illegible] Y1*WTWO
      [illegible](Z1+[illegible])*WTWO
      [illegible]+CORZ-BOUYZ
      [illegible]
      [illegible](Z2-WZ)+(X3+CORX-BOUYX)/WDENOM
      [illegible](Z2-WZ)+(Y3+CORY-BOUYY)/WDENOM
      [illegible]+Y1*WY)/(HI+RG)
      IF(ABS([illegible]1-[illegible]).GE.0.1) GO TO 22
      [illegible]
      VT=[illegible]((X2-WX)**2+(Y2-WY)**2+(Z2-WZ)**2)
      [illegible]AMS*([illegible]CORZ-Z3+WTHR*(RG+Z1))/(CD*AB*VT*(Z2-WZ)+WTHR*(RG+Z1)*VB)
      IF(RHO .LE. 0.) GO TO 88
      GO TO ([illegible],24),ISN
   22 P=[illegible]T+RU*RHO/AM[illegible]
      GO TO 2[illegible]
   24 [illegible]*RG**2*(HI-HII)*EXP(0.5*ALOG(RHO*RHOOO))/((RG+0.5*(HI+HII
     A [illegible]
      T=P[illegible]/(RU*RHO)
   25 AMC=VT*(SQRT(288.16/T))/340.29205
      RE=DIA*RHO*VT*(T+110.4)/(0.000001458*SQRT(T**3))
      [illegible]
      CALL DRAGT(CD,AMC,RE,IFLAG)
```

```
      IF(IFLAG)512,2000,512
  512 ICD=1
      IF(NPRT.EQ.0) GO TO 26
      CD=CD0+(CD-CD0)/3.
      IF(ABS(RHO-RHOO)/RHO.LT.0.003333) GO TO 28
      IF(NPRT.GE.5) GO TO 27
   26 RHOO=RHO
      NPRT=NPRT+1
      GO TO 20
   27 RHO=(RHO+RHOO)/2.0
      CD=(CD+CD0)/2.0
      NPRT=0
      GO TO 20
   28 RHOOO=RHO
      NPRT=0
      RHOO=RHO
      TBS=0.0
      RBS=0.0
      WXBS=0.0
      WYBS=0.0
      IF(IBC+1.GE.JMX) GO TO 45
      IF(HI.LT.60000.) GO TO 45
      IF(AMC.LE.AMC1.AND.AMC.GE..85.AND.AMC.LE.1.3) GO TO 460
   46 IF(BIASHI(IBCA).LE.HI) GO TO 47
      IBCA=IBCA+1
      GOTO 46
   47 IM1=IBCA
      IBC=IBCA-1
      RATIO=(HI-BIASHI(IM1))/(BIASHI(IBC)-BIASHI(IM1))
      GO TO 475
  460 IF(BIASMC(IBCM).LE.AMC) GO TO 470
      IBCM=IBCM+1
      GO TO 460
  470 IM1=IBCM
      IBC=IBCM-1
      RATIO=(AMC-BIASMC(IM1))/(BIASMC(IBC)-BIASMC(IM1))
  475 TBS=BIAST(IM1)+(BIAST(IBC)-BIAST(IM1))*RATIO
      RBS=BIASR(IM1)+(BIASR(IBC)-BIASR(IM1))*RATIO
      WXBS=BIASWX(IM1)+(BIASWX(IBC)-BIASWX(IM1))*RATIO
      WYBS=BIASWY(IM1)+(BIASWY(IBC)-BIASWY(IM1))*RATIO
      AMC1=AMC
   45 TCOR=T-TBS
      RHOCOR=RHO-RBS
      WXCOR=WX-WXBS
      WYCOR=WY-WYBS
      PICOR=TCOR*RU*RHOCOR/AMK
      WE=WXCOR*SZB+WYCOR*CZB
      WN=WXCOR*CZB-WYCOR*SZB
      WT=SQRT(WE**2+WN**2)
      CALL WANGI(THETA,WE,WN)
```

AD-A086 810 NEW MEXICO STATE UNIV LAS CRUCES DEPT OF ELECTRICAL --ETC F/G 9/2
THE DESCRIPTION OF THE ROBIN PROGRAM AND ITS CONVERSION TO THE --ETC(U)
MAY 80 M D MERRILL, D ELWELL DAAD07-76-C-0115
UNCLASSIFIED ERADCOM/ASL-CR-80-0115-1 NL

2 OF 2
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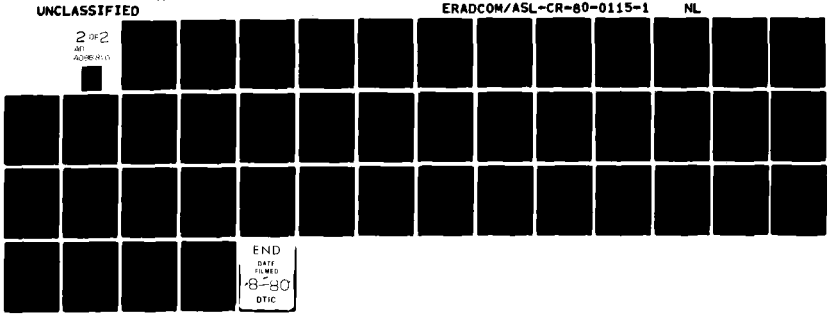

END
DATE FILMED
8-80
DTIC

```
401           IHETA=THETA
402           RHOMGS=RHOCOR*1000.
403           CALL DEV(VRHO,VWX,VWY,VPR,RHOMGS)
404           VP=SQRT(VPR)/(PI*999.831)
405           VT=SQRT(VP**2+VRHO**2)*100.0
406           VP=VP*100.0
407           VRHO=VRHO*100.
408           VN=SQRT((VWX*CZB)**2+(VWY*SZB)**2)
409           VE=SQRT((VWY*CZB)**2+(VWX*SZB)**2)
410           VWX=VE
411           VWY=VN
412           TND2=NA*PICOR/(RSTAR*TCOR)*1.0E-6
413        39 ITIM=TIM
414           MIN=ITIM/60
415           ISEC=ITIM -60*MIN
416           IHR=MIN/60
417           MIN=MIN-60*IHR
418           PIMB=0.01*PICOR
419           CFREQ=PICOR*7.80064E+5
420           TND1=RHOMGS*RTN
421           IT=TCOR+.5
422           IRE=RE
423           PII=PI
424           HII=HI
425           ALT=IH
426           IF(INTERP.GE.1) CALL INTER(INTERP,Z2,Z3,IY,IPGE,BIASHI(1))
427           IF(IPGE.LT.56) GO TO 33
428           IPGE=3
429           WRITE(IY,401)
430        33 CONTINUE
431           IF(HI.GT.BIASHI(1)) GO TO 43
432           IF(INTERP.EQ.0) WRITE(4,3000) ALT,T,RHOMGS,PIMB,WE,WN
433      3000 FORMAT(' ',6E10.4)
434           ISW=2
435           IF(INTERP.EQ.2) GO TO 2000
436           IPGE=IPGE+1
437           WRITE(IY,403) IHR,MIN,ISEC,IH,WE,WN,WT,IHETA,PIMB,IT,RHOMGS,Z2,Z3,
438          *TND2,CFREQ,VRHO,VP,VT,VWX,VWY
439           GO TO 2000
440        43 CONTINUE
441           IF(INTERP.EQ.2) GO TO 2050
442           IPGE=IPGE+1
443           WRITE(IY,434) IHR,MIN,ISEC,IH,Z2,Z3
444       434 FORMAT(1X,I2,2(1H:,I2),I7,45X,F8.2,F6.2)
445           GO TO 2050
446      2000 ICD=ICD+1
447           IF(ICD.LE.5) GO TO 2050
448           ICD=1
449           ISW=1
450      2050 CONTINUE
```

```
451             NPRT=0
452          32 K=KMAX2-1
453             DO 31 I=1,K
454             IP1=I+1
455             XMID(I)=XMID(IP1)
456             YMID(I)=YMID(IP1)
457             ZMID(I)=ZMID(IP1)
458             TMID(I)=TMID(IP1)
459             XVM(I)=XVM(IP1)
460             YVM(I)=YVM(IP1)
461             ZXM(I)=ZXM(IP1)
462          31 ZVM(I)=ZVM(IP1)
463             GO TO (29,30),KSN2
464          29 N=KMAX2
465             CALL FITON
466             CALL SLIDE(2,ICNT,IFLAG5)
467             IF(IFLAG5)240,40,90
468          30 N=KMAX2
469             CALL FITON2
470             CALL SLIDE(2,ICNT,IFLAG5)
471             IF(IFLAG5)240,40,90
472         240 IF(HI.LT.60000..AND.TIM.GT.TFT6+50.) GO TO 250
473             GO TO 260
474         250 IF(NZ1.EQ.51)  GO TO 260
475             NZ1=NZ1+4
476             TFT6=TFT6+50.
477             NZ1MID=NZ1/2+1
478             N1ST=IABS(NX1MID-NZ1MID)+1
479             ZVC=ZVM(KMAX2)
480             CALL LINEAR(NZ1)
481             GO TO 11
482         260 IF(ZVM(N2MID).NE.ZVC) GO TO 11
483             AN1=NZ1
484             DEL=.25
485             CONZ1=12./(DEL*AN1*(AN1*AN1-1.))
486             CONZ2=CONZ1+7.*(3.*AN1*AN1-7.)**2/(DEL*AN1*(AN1*AN1-1.)
487            1*(AN1*AN1-4.)*(AN1*AN1-9.))
488             CONZ3=CONZ3-RMSD
489             CONZ4=CONZ4-RMSD
490             CALL CORRS(NZ1,PZ1,NZ2,PZ2,RMSD,2)
491             CONZ3=CONZ3+RMSD
492             CONZ4=CONZ4+RMSD
493             GO TO 11
494       C     40 READ(IX) IDD
495          40 IF(ID-IDD) 90,36,90
496          36 ICNT=25
497             INTALT=0
498             IF(HI.LT.50000.) GO TO 301
499             IF(HI.LT.60000.) GO TO 1501
500             IF(HI.LT.70000.) GO TO 1502
```

```
501             IF(H1.LT.80000.) GO TO 1503
502             GO TO 301
503          1501 IF1=1
504             GO TO 301
505          1502 IFT=10
506             TFT3=999.
507             GO TO 301
508          1503 IFT=8
509             TFT2=999.
510             GO TO 361
511          C  35 READ(IX) IDD
512             35 IF(ID-IDD) 1500,37,1500
513             37 ICNT=25
514             GO TO 230
515             88 WRITE(IY,89)
516             89 FORMAT('1***** DENSITY IS NON-POSITIVE -- EXECUTION HALTED *****')
517             90 ALT=-999.
518             WRITE(IY,91)
519             91 FORMAT(///10X,19HNORMAL END OF ROBIN)
520             WRITE (4,3000) ALT,T,RHOMGS,PIMB,WE,WN
521             WRITE (4,3000) COLAPS
522             CALL TAB(ESALT,IY)
523             ITIN=-999
524          1500 STOP
525          $ASSM
526                LIST
527          $FORT
528             END
```

```
$ASSM
          SCRAT
ATMOS     PROG  TEMP&DENSE CALC   28 NOV 79 R01  S REM3:ATMOS.FOR
          CROSS
          NORX3
          NLSTC
          NLIST
$FORT
      SUBROUTINE ATMOS(HI,T,RHOO)
      INTEGER*2 TP(302),DN(302),J,TNPW,I,KH,JOFS(5)
      REAL HSTS(5),HSTP(5)
C
C     REVISED TABLE FOR 1976 STANDARD ATMOSPHERE
C     50KM - 100KM IN 0.5KM STEPS
C     100KM - 141KM IN 1.0KM STEPS
C
      DATA JOFS,HSTP/261,161,71,51,1,1000.,500.,200.,100.,200./
      DATA HSTS/100000.,50000.,32000.,30000.,20000./
      DATA (TP(I),I=1,74)/ 21665, 21678,
     X 21698, 21718, 21738, 21758, 21778, 21797,
     X 21817, 21837, 21857, 21877, 21897, 21917,
     X 21936, 21956, 21976, 21996, 22016, 22036,
     X 22056, 22075, 22095, 22115, 22135, 22155,
     X 22175, 22194, 22214, 22234, 22254, 22274,
     X 22294, 22313, 22333, 22353, 22373, 22393,
     X 22413, 22432, 22452, 22472, 22492, 22512,
     X 22532, 22551, 22571, 22591, 22611, 22631,
     X 22650, 22660, 22670, 22680, 22690, 22700,
     X 22710, 22720, 22730, 22740, 22750, 22759,
     X 22769, 22779, 22789, 22799, 22809, 22819,
     X 22829, 22839, 22849, 22875, 22931, 22986/
      DATA (TP(I),I=75,160)/
     X 23041, 23097, 23152, 23208, 23263, 23318,
     X 23374, 23429, 23485, 23540, 23595, 23651,
     X 23706, 23762, 23817, 23872, 23928, 23983,
     X 24039, 24094, 24149, 24205, 24260, 24315,
     X 24371, 24426, 24481, 24537, 24592, 24647,
     X 24703, 24758, 24813, 24869, 24924, 24979,
     X 25035, 25090, 25145, 25200, 25256, 25311,
     X 25366, 25422, 25477, 25532, 25587, 25643,
     X 25698, 25753, 25808, 25864, 25919, 25974,
     X 26029, 26085, 26140, 26195, 26250, 26306,
     X 26361, 26416, 26471, 26526, 26582, 26637,
     X 26692, 26747, 26802, 26858, 26913, 26968,
     X 27023, 27065, 27065, 27065, 27065, 27065,
     X 27065, 27065, 27065, 27065, 27065, 27065,
     X 27065, 27065/
      DATA (TP(I),I=161,229)/ 27065 ,27065 ,27065 ,27041 ,
     X 26903, 26765, 26628, 26490, 26352, 26215,
     X 26077, 25940, 25802, 25664, 25527, 25389,
```

```
     X 25252, 25114, 24977, 24840, 24702, 24565,
     X 24425, 24290, 24153, 24015, 23878, 23741,
     X 23604, 23466, 23329, 23192, 23055, 22918,
     X 22781, 22644, 22506, 22369, 22232, 22095,
     X 21958, 21821, 21685, 21548, 21426, 21328,
     X 21231, 21133, 21035, 20938, 20840, 20742,
     X 20645, 20547, 20449, 20352, 20254, 20156,
     X 20059, 19961, 19864, 19766, 19669, 19571,
     X 19474, 19376, 19279, 19181, 19084 /
      DATA (TP(I), I=230,302)/ 18987,
     X 18889, 18792, 18687, 18687, 18687, 18687,
     X 18687, 18687, 18687, 18687, 18687, 18687,
     X 18687, 18689, 18696, 18708, 18725, 18747,
     X 18774, 18805, 18842, 18884, 18931, 18983,
     X 19040, 19104, 19172, 19247, 19328, 19415,
     X 19508, 19716, 19953, 20223, 20531, 20884,
     X 21289, 21763, 22329, 23033, 24000, 25200,
     X 26400, 27600, 28800, 30000, 31200, 3240 ,
     X 3360,  3480,  3600,  3719,  3835,  3949,
     X 4062,  4172,  4280,  4386,  4490,  4592,
     X 4693,  4791,  4887,  4982,  5075,  5166,
     X 5255,  5343,  5429,  5513,  5596,  5678  /
C
      DATA (DN(I), I=1,74)/ 8891,8611,
     X 8338,  8074,  7818,  7571,  7332,  7101,
     X 6877,  6660,  6451,  6248,  6052,  5862,
     X 5678,  5500,  5328,  5161,  5000,  4844,
     X 4693,  4547,  4406,  4269,  4136,  4008,
     X 3884,  3763,  3647,  3534,  3425,  3320,
     X 3217,  3118,  3022,  2929,  2839,  2752,
     X 2668,  2586,  2507,  2431,  2356,  2284,
     X 2215,  2147,  2082,  2019,  1957,  1898,
     X 1841,  1812,  1785,  1758,  1731,  1704,
     X 1679,  1653,  1628,  1603,  1579,  1555,
     X 1531,  1508,  1485,  1462,  1440,  1419,
     X 1397,  1376,  1355,  1314,  1273,  1233/
      DATH (DN(I), I=75,160)/
     X 1194,  1157,  1121,  1086,  1052,  1020,
     X 9887,  9583,  9289,  9004,  8729,  8463,
     X 8206,  7957,  7716,  7483,  7257,  7039,
     X 6828,  6624,  6426,  6235,  6050,  5870,
     X 5697,  5529,  5366,  5209,  5056,  4908,
     X 4765,  4626,  4492,  4362,  4236,  4114,
     X 3995,  3881,  3769,  3662,  3557,  3456,
     X 3358,  3263,  3170,  3081,  2994,  2910,
     X 2829,  2750,  2673,  2598,  2526,  2456,
     X 2388,  2322,  2258,  2196,  2136,  2078,
     X 2021,  1966,  1912,  1860,  1810,  1761,
     X 1714,  1668,  1623,  1579,  1537,  1496,
     X 1456,  1418,  1383,  1349,  1316,  1284,
```

```
     X 1252, 1222, 1192, 1162, 1134, 1106,
     X 1079, 1053/
      DATA (DN(I),I=161,229)/ 1027 ,9650 ,9069 ,8530 ,
     X 8056, 7606, 7179, 6774, 6390, 6026,
     X 5681, 5354, 5044, 4751, 4474, 4211,
     X 3963, 3728, 3505, 3295, 3097, 2909,
     X 2732, 2565, 2407, 2258, 2118, 1985,
     X 1860, 1743, 1632, 1528, 1430, 1337,
     X 1250, 1168, 1092, 1019, 9517, 8880,
     X 8283, 7722, 7197, 6704, 6237, 5795,
     X 5382, 4997, 4639, 4304, 3992, 3702,
     X 3431, 3179, 2945, 2727, 2524, 2335,
     X 2160, 1997, 1846, 1705, 1575, 1454,
     X 1342, 1238, 1141, 1052, 9694 /
      DATA (DN(I),I=230,302)/ 8928,
     X 8220, 7564, 6958, 6366, 5824, 5328,
     X 4875, 4460, 4081, 3734, 3416, 3126,
     X 2860, 2616, 2393, 2188, 2000, 1828,
     X 1670, 1526, 1393, 1273, 1162, 1061,
     X 9685, 8842, 8071, 7367, 6725, 6139,
     X 5604, 4695, 3935, 3300, 2769, 2325,
     X 1954, 1643, 1381, 1161, 9708, 8111,
     X 6838, 5811, 4975, 4289, 3720, 3246,
     X 2847, 2509, 2222, 1977, 1767, 1585,
     X 1428, 1291, 1171, 1065, 9717, 8889,
     X 8152, 7494, 6904, 6374, 5897, 5465,
     X 5074, 4719, 4396, 4101, 3831, 3584 /
      DO 10 KH=1,5
      IF(HI.GE.HSTS(KH))GO TO 20
10    CONTINUE
      KH=KH-1
20    DLH=HSTP(KH)
      IDLH=DLH
      IHI=(INT(HI/DLH))*IDLH
      J=(HI-HSTS(KH))/DLH+JOFS(KH)
30    IF(J.LE.276)GO TO 40
      TP2=TP(J+1)/10.
      IF(J.EQ.277)GO TO 45
      TP1=TP(J)/10.
      GO TO 50
40    TP2=TP(J+1)/100.
45    TP1=TP(J)/100.
50    TNPW=-5
      IF(J.GT.80)TNPW=-6
      IF(J.GT.161)TNPW=-7
      IF(J.GT.198)TNPW=-8
      IF(J.GT.228)TNPW=-9
      IF(J.GT.254)TNPW=-10
      IF(J.GT.270)TNPW=-11
      IF(J.GT.288)TNPW=-12
```

```
151             DN1=DN(J)*(10. **TNPW)
152             IF((J. EQ. 80). OR. (J. EQ. 161). OR. (J. EQ. 198))GO TO 60
153             IF((J. EQ. 228). OR. (J. EQ. 254). OR. (J. EQ. 270))GO TO 60
154             IF(J. EQ. 288)GO TO 60
155             GO TO 70
156     60      TNPW=TNPW-1
157     70      DN2=DN(J+1)*(10. **TNPW)
158             RATIO=(HI-IHI)/DLH
159             T=TP1+RATIO*(TP2-TP1)
160             RHOO=DN1*((DN2/DN1)**RATIO)
161     100     CONTINUE
162             RETURN
163             END
```

```
$ASSM
        SCRAT
BLKDTA  PROG  INITIALIZE COEFFS  14 NOV 79 R01 S REM3:BLKDTA.FOR
        CROSS
        NORX3
        NLSTC
        NLIST
$FORT
      BLOCK DATA
      COMMON /COFF/PXY1(51),PXY2(35),PZ2(21),PZ1(51)
      DATA PXY1/      .0049275309,
     X  .0032924339,  .0018334202,  .0005431455, -.0005857183,
     X -.0015605104, -.0023885688, -.0030772295, -.0036338298,
     X -.0040657036, -.0043801926, -.0045846291, -.0046863556,
     X -.0046926998, -.0046110079, -.0044486076, -.0042128451,
     X -.0039110482, -.0035505621, -.0031387159, -.0026828498,
     X -.0021903003, -.0016684036, -.0011244968, -.0005659165,
     X  .0000000000,  .0005659165,  .0011244968,  .0016684036,
     X  .0021903003,  .0026828498,  .0031387159,  .0035505621,
     X  .0039110482,  .0042128451,  .0044486076,  .0046110079,
     X  .0046926998,  .0046863556,  .0045846291,  .0043801926,
     X  .0040657036,  .0036338298,  .0030772295,  .0023885688,
     X  .0015605104,  .0005857183, -.0005431455, -.0018334202,
     X -.0032924339, -.0049275309/
      DATA PXY2/      .0097315572,  .0048963241,  .0008361526,
     X -.0024974160, -.0051528104, -.0071784742, -.0086228512,
     X -.0095343813, -.0099615045, -.0099526607, -.0095562898,
     X -.0088208355, -.0077947341, -.0065264329, -.0050643682,
     X -.0034569805, -.0017527097, -.0000000000,  .0017527097,
     X  .0034569805,  .0050643682,  .0065264329,  .0077947341,
     X  .0088208355,  .0095562898,  .0099526607,  .0099615045,
     X  .0095343813,  .0086228512,  .0071784742,  .0051528104,
     X  .0024974160, -.0008361526, -.0048963241, -.0097315572/
      DATA PZ2/       .0231351145,
     X  .0027605407, -.0119105503, -.0215118565, -.0266771168,
     X -.0280400403, -.0262343623, -.0218937919, -.0156520642,
     X -.0081428923,  .0000000000,  .0081428923,  .0156520642,
     X  .0218937919,  .0262343623,  .0280400403,  .0266771168,
     X  .0215118565,  .0119105503, -.0027605407, -.0231351145/
      END
```

```
$HSSM
        SCRAT
CONTRL  PROG    CONTROLS FLOW  30 NOV 79 R01   S REM3:CONTRL.FOR
        CROSS
        NORX3
        NLSTC
        NLIST
#FORT
      SUBROUTINE CONTRL(GS,N2MID,KSW2,KSN,IPGF,IY)
      COMMON /CONST/ RG,PHI,HMSL,AMS,ZB,DIA,VB,AM,GSRG,AB
      COMMON /COEF/ PXY1(51),PXY2(35),PZ2(21),PZ1(51)
      COMMON /THEO/ ZT(3),RZ(3),DZ,XT(3),RX(3),DX,YT(3),
     X              RY(3),DY,WX,WY
      COMMON /CORIS/ OMEGA,CPH,CPHCZB,CPHSZB,CZB,SPH,SZB
      COMMON TIME(100),X(100),Y(100),Z(100),TMID(50),XMID(50),YMID(50),
     A ZMID(50),XVM(50),YVM(50),ZVM(50),IX,J,N,MIDMAX,KMAX1,KMAX2,
     B C1,N1ST,NXY1,NZ1,ZXM(50)
C
      INTEGER*2 IX,J,N,MIDMAX,KMAX1,KMAX2,N1ST,NXY1,NZ1
      INTEGER*2 I,MM,IY,IPGF,KSN,KSW2,N2MID
C
      DIMENSION IGAR(806),ICOMSV(806)
      EQUIVALENCE (TIME(1),IGAR(1))
      MM=NZ1/2+1
      XT(1)=X(MM)
      YT(1)=Y(MM)
      ZT(1)=Z(MM)
      XT(2)=0.0
      YT(2)=0.0
      Z1(2)=0.0
      DO 1 I=1,NZ1
      XT(2)=XT(2)+PZ1(I)*X(I)*2.0
      YT(2)=YT(2)+PZ1(I)*Y(I)*2.0
    1 ZT(2)=ZT(2)+PZ1(I)*Z(I)*2.0
      GSRG=GS/RG
      AM=2.0*AB/AMS
      RAD=57.29527795
      CZB=COS(ZB/RAD)
      SZB=SIN(ZB/RAD)
      OMEGA=0.0001458
      CPH=COS(PHI/RAD)
      SPH=SIN(PHI/RAD)
      CPHSZB=CPH*SZB
      CPHCZB=CPH*CZB
      WX=0.0
      WY=0.0
      DO 10 I=1,806
   10 ICOMSV(I)=IGAR(I)
      CALL TROBIN(GS,N2MID,KSW2,KSN,IPGF,IY)
      DO 20 I=1,806
   20 IGAR(I)=ICOMSV(I)
      RETURN
      END
```

```
1     $ASSM
2               SCRAT
3     CORRS     PROG  NUM OF SMOOTH PTS  14 NOV 79 R01  S REM3:CORRS.FOR
4               CROSS
5               NORX3
6               NLSTC
7               NLIST
8     $FORT
9           SUBROUTINE CORRS(N,A,M,B,C2,IS)
10          DIMENSION A(1),B(1)
11          INTEGER*2 I,J,K,IN,IR,IW,M,N
12          D=0.0
13          DO 1 I=1,N
14    1     D=D+A(I)*A(I)
15          C2=0.0
16          DO 50 J=1,M
17          DO 50 K=1,M
18          IF(J.EQ.K) GO TO 50
19          IR=IABS(IS*(J-K))
20          IN=N-IR
21          RMSR=0.0
22          IF(IN.LE.0) GOTO 50
23          DO 10 I=1,IN
24          IW=I+IR
25    10    RMSR=RMSR+A(I)*A(IW)
26          RMSR=RMSR/D
27          C2=C2+B(J)*B(K)*RMSR
28    50    CONTINUE
29          RETURN
30    $ASSM
31              LIST
32    $FORT
33          END
```

```
$ASSM
          SCRAT
DECALT    PROG  SPHERE DROPPING   14 NOV 79 R01  S REM3:DECALT.FOR
          CROSS
          NORX3
          NLSTC
          NLIST
$FORT
      SUBROUTINE DECALT(JCNT,IFLAG1)
      COMMON TIME(100),X(100),Y(100),Z(100),TMID(50),XMID(50),YMID(50),
     A ZMID(50),XVM(50),YVM(50),ZVM(50),IX,J,N,MIDMAX,KMAX1,KMAX2,
     B C1,N1ST,NXY1,NZ1,ZXM(50)
      INTEGER*2 IBND,ICNT,JCNT,IFLAG1
      INTEGER*2 IX,J,N,MIDMAX,KMAX1,KMAX2,N1ST,NXY1,NZ1
      IFLAG1=-1
      R=6371229.315
      S11=0.
      S21=0.
      S31=0.
C     DATA READ S1=X,S2=Y,S3=Z
    1 READ(1,20,END=8) T,S1,S2,S3
   20 FORMAT(4E18.7)
      DIFS=((S1-S11)*(S1+S11)+(S2-S21)*(S2+S21))
      DLTH=S31-S3-DIFS/(R*6.561666)
      IF(DLTH) 2,2,3
    2 ICNT=0
      GO TO 4
    3 ICNT=ICNT+1
      IF(5-ICNT)5,5,4
    4 S11=S1
      S21=S2
      S31=S3
      GO TO 1
    5 IBND=7
      TM=T*10.0
      FT=(IFIX(TM)+IBND)/10.
    6 READ(1,20,END=8) T,S1,S2,S3
      IF(FT - T) 7,7,6
    7 RETURN
    8 IFLAG1=0
      RETURN
$ASSM
          LIST
$FORT
      END
```

```
$ASSM
          SCRAT
DEV       PROG  POS,DENSE,&WIND CHG  14 NOV 79 R01  S REM3:DEV.FOR
          CROSS
          NORX3
          NLSTC
          NLIST
$FORT
      SUBROUTINE DEV(VRHO,VWX,VWY,VP,RHOOO)
      COMMON TIME(100),X(100),Y(100),Z(100),TMID(50),XMID(50),YMID(50),
     A ZMID(50),XVM(50),YVM(50),ZVM(50),IX,J,N,MIDMAX,KMAX1,KMAX2,
     B C1,N1ST,NXY1,NZ1,ZXM(50)
      COMMON /D/X1,X2,X3,Y1,Y2,Y3,Z1,Z2,Z2X,Z3,Z3X,CONX1,CONX2,CONX3,
     A CONX4,CONZ1,CONZ2,CONZ3,CONZ4,GS,IDEGX2,IDEGX1,IDEGZ2,IDEGZ1
     B,N2MID
      INTEGER*2 IX,J,N,MIDMAX,KMAX1,KMAX2,N1ST,NXY1,NZ1
      INTEGER*2 IV,IDEGX1,IDEGX2,IDEGZ1,IDEGZ2,N2MID
      DATA IV/0/
      VARR=36
      VARE=(.15)*(.15)*.96383E-6
      VARA=VARE
      TWOSQ=X1*X1+Y1*Y1
      THRSQ=TWOSQ+Z1*Z1
      VARX=X1*X1*VARR/THRSQ+X1*X1*Z1*Z1*VARE/TWOSQ+Y1*Y1*VARA
      VARY=Y1*Y1*VARR/THRSQ+Y1*Y1*Z1*Z1*VARE/TWOSQ+X1*X1*VARA
      VARZ=Z1*Z1*VARR/THRSQ+TWOSQ*VARE
      IF(IDEGX1.NE.1) GO TO 310
      VARXV=CONX1*VARX
      VARYV=CONX1*VARY
      VARXZV=CONX1*VARZ
      GO TO 320
  310 VARXV=CONX2*VARX
      VARYV=CONX2*VARY
      VARXZV=CONX2*VARZ
  320 IF(IDEGX2.NE.1) GO TO 330
      VARXA=CONX3*VARXV
      VARYA=CONX3*VARYV
      VARXZA=CONX3*VARXZV
      GO TO 340
  330 VARXA=CONX4*VARXV
      VARYA=CONX4*VARYV
      VARXZA=CONX4*VARXZV
  340 IF(IDEGZ1.NE.1) GO TO 350
      VARZV=SQRT(CONZ1*VARZ)
      GO TO 360
  350 VARZV=SQRT(CONZ2*VARZ)
  360 IF(IDEGZ2.NE.1) GO TO 370
      VARZA=SQRT(CONZ3*VARZV**2)
      GO TO 380
  370 VARZA=SQRT(CONZ4*VARZV**2)
```

```
      380 VRHO=(2. *VARZV/Z2)**2+(VARZA/(Z3-GS))**2
          IF(IV.EQ.1) GO TO 390
          VP=GS**2/4.0*VRHO*(ZMID(N2MID)-ZMID(N2MID+1))**2*RHOOO**2
          IV=1
          GO TO 400
      390 VP=VP+GS**2/4.0*VRHO*(ZMID(N2MID-1)-ZMID(N2MID+1))**2*RHOOO**2
      400 VRHO=SQRT(VRHO)
          VWX=SQRT(VARXV+(Z2X/(Z3X-GS))**2*VARXA+(X3/(Z3X-GS))**2*VARXZV+
         1(X3*Z2X/(Z3X-GS)**2)**2*VARXZA)
          VWY=SQRT(VARYV+(Z2X/(Z3X-GS))**2*VARYA+(Y3/(Z3X-GS))**2*VARXZV+
         1(Y3*Z2X/(Z3X-GS)**2)**2*VARXZA)
          RETURN
$ASSM
              LIST
$FORT
          END
```

```
$ASSM
  SCRAT
DRAGT  PROG  DRAG TABLE   14 NOV 79 R01  S REM3:DRAGT.FOR
  CROSS
  NORX3
  NLSTC
  NLIST
$FORT
      SUBROUTINE DRAGT(CD,AMC,RE,IFLAG)
C   ROUTINE SENT RE,AMC : REYNOLDS NO., MACH NO.
C   RETURNS CD : DRAG COEF.
C  IFLAG= -1 VALID CD; IFLAG = 0 NO CD
      DIMENSION DRAG(2,2)
      INTEGER*2 AR1(24,22),AR2(17,31),AR3(16,15)
      INTEGER*2 RENL(40),AMACH(53)
      INTEGER*2 AR1A(24,8),AR1B(24,7),AR1C(24,7)
      INTEGER*2 AR2A(17,8),AR2B(17,7),AR2C(17,8),AR2D(17,8)
      INTEGER*2 I,J,I6,J14,II,JJ,NMA,IFLAG,I1,J1
      EQUIVALENCE (AR1(1,1),AR1A(1,1)),(AR1(1,9),AR1B(1,1)),
     X            (AR1(1,16),AR1C(1,1)),(AR2(1,1),AR2A(1,1)),
     X            (AR2(1,9),AR2B(1,1)),(AR2(1,16),AR2C(1,1)),
     X            (AR2(1,24),AR2D(1,1))
C
      DATA AR1A/
     X1673,1604,1535,1491,1449,1384,1342,1289,1250,1199,1171,1142,
     X1132,1104,1075,1069,1055,1038,   0,   0,   0,   0,   0,   0,
     X1683,1612,1541,1491,1452,1392,1347,1292,1252,1200,1171,1144,
     X1134,1106,1078,1069,1055,1041,   0,   0,   0,   0,   0,   0,
     X1697,1622,1547,1495,1458,1400,1352,1298,1254,1202,1171,1147,
     X1136,1108,1080,1067,1055,1043,   0,   0,   0,   0,   0,   0,
     X1720,1640,1555,1503,1463,1410,1358,1302,1259,1207,1175,1150,
     X1138,1110,1082,1065,1055,1045,   0,   0,   0,   0,   0,   0,
     X1749,1658,1567,1519,1473,1420,1366,1310,1266,1212,1184,1157,
     X1141,1111,1088,1070,1058,1051,   0,   0,   0,   0,   0,   0,
     X1780,1680,1580,1533,1485,1430,1375,1319,1275,1220,1192,1163,
     X1149,1122,1095,1076,1062,1055,   0,   0,   0,   0,   0,   0,
     X1809,1703,1597,1548,1498,1444,1390,1330,1287,1230,1202,1173,
     X1158,1130,1101,1084,1066,1060,   0,   0,   0,   0,   0,   0,
     X1841,1728,1615,1564,1512,1456,1400,1341,1298,1242,1214,1186,
     X1170,1140,1109,1097,1084,1072,   0,   0,   0,   0,   0,   0/
      DATA AR1B/
     X1870,1753,1636,1582,1528,1471,1414,1355,1310,1257,1227,1196,
     X1179,1146,1113,1100,1089,1075,1063,1050,   0,   0,   0,   0,
     X1903,1780,1657,1601,1545,1487,1429,1368,1322,1270,1237,1203,
     X1186,1153,1120,1106,1092,1079,1065,1052,   0,   0,   0,   0,
     X1941,1810,1679,1621,1562,1502,1442,1382,1337,1282,1246,1210,
     X1192,1157,1122,1108,1094,1080,1066,1053,   0,   0,   0,   0,
     X1958,1825,1692,1632,1572,1511,1450,1390,1342,1288,1251,1213,
     X1195,1160,1124,1110,1096,1081,1065,1053,1046,1038,1025,1015,
     X1976,1841,1706,1644,1582,1520,1458,1397,1350,1293,1255,1217,
```

```
     X1199,1162,1125,1111,1097,1082,1064,1054,1047,1039,1026,1016,
     X1999,1860,1721,1657,1592,1529,1465,1403,1356,1298,1259,1219,
     X1200,1163,1126,1111,1096,1082,1064,1052,1046,1037,1025,1016,
     X2023,1880,1737,1671,1604,1538,1472,1410,1361,1302,1262,1221,
     X1202,1163,1125,1110,1095,1081,1063,1051,1044,1034,1022,1012/
      DATA AR1C/
     X2046,1901,1756,1687,1618,1549,1480,1418,1368,1306,1265,1223,
     X1203,1164,1124,1109,1094,1080,1063,1050,1042,1032,1019,1009,
     X2077,1927,1777,1705,1633,1562,1490,1422,1372,1307,1265,1222,
     X1202,1162,1122,1108,1093,1078,1063,1048,1043,1032,1020,1010,
     X2090,1940,1790,1717,1644,1568,1496,1427,1374,1306,1264,1221,
     X1200,1158,1120,1105,1087,1074,1061,1046,1039,1023,1017,1007,
     X2107,1956,1805,1731,1658,1580,1502,1430,1376,1305,1263,1220,
     X1199,1157,1119,1103,1088,1073,1058,1042,1036,1023,1014,1004,
     X2123,1972,1821,1746,1671,1590,1510,1432,1378,1302,1260,1217,
     X1196,1154,1116,1102,1086,1070,1054,1039,1032,1023,1010,1000,
     X2142,1990,1838,1762,1686,1603,1519,1435,1379,1300,1258,1215,
     X1194,1152,1112,1096,1081,1066,1051,1036,1028,1019,1006, 996,
     X2169,2007,1859,1780,1700,1613,1527,1438,1379,1298,1253,1211,
     X1191,1151,1110,1095,1079,1063,1047,1031,1023,1014,1001, 991/
C
      DATA AR2F/
     X1442,1380,1297,1245,1210,1179,1141,1106,1083,
     X1066,1051,1036,1027,1020,1010, 997, 987,
     X1443,1378,1292,1240,1205,1173,1137,1100,1078,
     X1061,1046,1031,1022,1017,1005, 991, 981,
     X1443,1376,1287,1234,1197,1167,1132,1095,1073,
     X1054,1041,1034,1018,1011,1000, 985, 975,
     X1444,1373,1280,1227,1190,1160,1120,1090,1065,
     X1049,1032,1026,1010,1004, 992, 978, 967,
     X1445,1369,1273,1218,1184,1154,1117,1086,1061,
     X1044,1027,1016,1003, 992, 983, 971, 960,
     X1445,1365,1266,1209,1174,1146,1108,1079,1053,
     X1037,1020,1011, 996, 985, 977, 962, 951,
     X1444,1359,1257,1198,1162,1136,1098,1072,1044,
     X1027,1011,1001, 989, 977, 969, 953, 942,
     X1442,1355,1249,1186,1150,1123,1081,1061,1034,
     X1016,1000, 991, 977, 967, 958, 940, 929/
      DATA AR2B/
     X1440,1347,1238,1172,1132,1107,1068,1046,1021,
     X1002, 986, 980, 968, 956, 945, 928, 917,
     X1437,1339,1230,1160,1115,1085,1050,1030,1005,
     X 987, 971, 960, 948, 940, 929, 910, 897,
     X1436,1327,1214,1143,1095,1070,1034,1011, 986,
     X 964, 954, 942, 929, 924, 910, 892, 878,
     X1432,1315,1197,1125,1076,1052,1014, 990, 968,
     X 947, 931, 919, 906, 900, 888, 867, 854,
     X1426,1298,1180,1106,1057,1032, 993, 968, 947,
     X 936, 918, 907, 892, 881, 870, 855, 841,
     X1414,1281,1156,1080,1037,1013, 972, 946, 926,
```

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     X 910, 895, 882, 864, 854, 846, 828, 813,
     X1377,1247,1119,1052,1008, 987, 945, 916, 891,
     X 869, 857, 841, 829, 818, 808, 796, 781/
      DATA AR2C/
     X1175,1063, 952, 900, 857, 837, 798, 773, 750,
     X 727, 715, 705, 696, 686, 677, 667, 656,
     X1088, 984, 880, 825, 787, 770, 731, 701, 678,
     X 661, 652, 638, 624, 620, 610, 602, 593,
     X1037, 928, 825, 770, 737, 710, 677, 650, 625,
     X 611, 600, 589, 579, 575, 564, 558, 551,
     X 996, 899, 784, 731, 692, 670, 635, 607, 584,
     X 571, 562, 551, 541, 535, 530, 525, 519,
     X 974, 874, 753, 700, 657, 637, 603, 571, 549,
     X 537, 526, 518, 511, 505, 500, 499, 494,
     X 955, 853, 728, 674, 632, 614, 575, 542, 527,
     X 515, 504, 498, 488, 483, 479, 473, 470,
     X 938, 834, 708, 657, 613, 588, 555, 529, 515,
     X 498, 486, 481, 477, 474, 469, 462, 457,
     X 925, 819, 689, 639, 598, 572, 540, 517, 500,
     X 489, 479, 470, 463, 460, 456, 450, 448/
      DATA AR2D/
     X 914, 810, 681, 630, 588, 561, 527, 507, 493,
     X 480, 473, 459, 452, 450, 445, 443, 438,
     X 905, 798, 672, 620, 580, 553, 516, 498, 484,
     X 472, 464, 452, 443, 442, 436, 434, 430,
     X 884, 789, 664, 606, 572, 546, 510, 491, 475,
     X 465, 456, 445, 436, 435, 426, 425, 421,
     X 874, 781, 659, 599, 564, 540, 503, 484, 467,
     X 457, 448, 437, 429, 426, 419, 416, 411,
     X 857, 770, 652, 590, 550, 529, 494, 472, 454,
     X 445, 435, 428, 421, 414, 407, 402, 395,
     X 849, 762, 649, 584, 543, 518, 486, 461, 444,
     X 435, 424, 419, 410, 405, 399, 391, 384,
     X 846, 758, 648, 577, 535, 505, 470, 449, 433,
     X 425, 416, 406, 398, 393, 391, 384, 377,
     X 844, 751, 647, 575, 530, 492, 460, 444, 430,
     X 414, 407, 396, 389, 387, 384, 380, 372/
C
      DATA AR3/
     X584,575,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,
     X544,537,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,
     X513,507,501,500,499,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,
     X490,486,481,480,480,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,
     X464,458,457,458,458,459,461,465,469,475,477,485,497,502,511,512,
     X451,449,446,449,450,451,454,456,459,463,468,483,487,495,501,505,
     X444,443,442,441,442,443,444,447,450,451,462,472,479,485,491,496,
     X437,432,431,432,433,434,438,440,442,443,456,464,472,479,485,492,
     X429,424,425,426,427,428,431,432,434,435,449,456,465,474,480,486,
     X420,416,420,423,425,426,428,431,432,433,444,450,459,468,475,480,
     X410,408,416,420,423,424,425,426,427,431,442,448,455,463,468,475,
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151           X394, 398, 402, 407, 410, 412, 414, 417, 420, 429, 435, 441, 445, 454, 457, 465,
152           X383, 382, 391, 396, 398, 400, 406, 408, 410, 417, 428, 436, 440, 449, 451, 456,
153           X376, 376, 385, 391, 393, 395, 400, 402, 404, 407, 419, 431, 439, 448, 450, 455,
154           X371, 370, 379, 386, 389, 391, 394, 396, 399, 402, 410, 425, 438, 447, 450, 455/
155     C
156            DATA RFNL/
157           X  1,   2,   3,   4,   5,  -1,  10,  15,  20,  30,  40,  50,  60,  80, 100, 120,
158           X140, 160, 180, 200, 220, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 800,
159           X 900,1000,1500,2000,2500,3000,3500,4000/
160     C
161            DATA AMACH/
162           X490, 440, 420, 400, 380, 360, 340, 320, 300, 280, 260, 250, 240, 230, 220, 210,
163           X200, 190, 180, 175, 170, 165, 160, 155, 150, 145, 140, 135, 130, 125,
164           X120, 115, 110, 105, 100,  95,  90,  85,  80,  75,  70,  65,  60,  55,  50,  45,
165           X 40,  30,  20,  10,   0/
166     C
167     C
168            IF(RF .GT. 4000.0 .OR. AMC .GT. 1.8) GOTO 10
169            I=3
170            GOTO 70
171     10     IF(RF-10.) 20, 30, 30
172     20     I=1
173            GOTO 70
174     30     IF(RF-40000.) 50, 50, 40
175     40     I=39
176            GOTO 70
177     50     DO 60 I=1,39
178            I=I
179            TR1=RFNL(I+1)*10.
180            IF(TR1 .LT. 0.) TR1=75.
181            IF(RF .LT. TR1) 70, 60, 60
182     60     CONTINUE
183     70     IF(AMC-4.6) 90, 90, 80
184     80     J=1
185            GOTO 110
186     90     DO 100 J14=1,52
187            J=J14
188            TR1=AMACH(J+1)/100.
189            IF(AMC-TR1) 100, 110, 110
190     100    CONTINUE
191     C
192     C    DRAG TABLE SPLIT INTO THREE SUB-ARRAYS:
193     C         AR1, AR2, AR3
194     C    IF NOT IN OF THESE, COEF=0
195     C    FIND FOUR COEF: (I,J), (I+1,J), (I,J+1), (I+1,J+1)
196     C
197     110    DO 200 M=1,2
198            DO 200 N=1,2
199            II=I+M-1
200            JJ=J+N-1
```

```
201             NMA=4
202             IF(II.LE.24) GO TO 120
203             IF(JJ.LT.39) GO TO 140
204             NMA=3
205             GO TO 140
206     120     IF(JJ.GT.22) GO TO 130
207             NMA=1
208             GO TO 140
209     130     IF(II.LT.8) GO TO 140
210             NMA=2
211     140     GO TO (150,160,170,220), NMA
212     150     DGV=AR1(II,JJ)/1000.
213             GO TO 190
214     160     I1=II-7
215             J1=JJ-22
216             DGV=AR2(I1,J1)/1000.
217             GO TO 190
218     170     I1=II-24
219             J1=JJ-38
220             DGV=AR3(I1,J1)/1000.
221     190     CONTINUE
222             DRAG(M,N)=DGV
223     200     CONTINUE
224     C
225             TR1=RENL(I)*10.
226             IF(TR1.LT.0.) TR1=75.
227             TR2=RENL(I+1)*10.
228             IF(TR2.LT.0.) TR2=75.
229             R1=(TR1-RE)/(TR1-TR2)
230             TR1=AMACH(J)/100.
231             TR2=AMACH(J+1)/100.
232             R2=(TR1-AMC)/(TR1-TR2)
233     210     IF(DRAG(2,1).EQ.0.0.OR.DRAG(1,1).EQ.0.0.OR.DRAG(2,2).EQ.0.0
234            X   .OR.DRAG(1,2).EQ.0.0) GOTO 220
235             CD1=R1*(DRAG(2,1)-DRAG(1,1))+DRAG(1,1)
236             CD2=R1*(DRAG(2,2)-DRAG(1,2))+DRAG(1,2)
237             CD=R2*(CD2-CD1)+CD1
238             IFLAG=-1
239             RETURN
240     220     IRE=RE
241             WRITE(4,500) AMC,IRE
242             IFLAG=0
243             RETURN
244     500     FORMAT(/38X,20HDRAG VALUE NOT GIVEN,14X,F5.2,I6)
245     $ASSM
246       LIST
247     $FORT
248             END
```

```
$ASSM
        SCRAT
DRVT    PROG  FINDS DRAG VALUE   14 NOV 79 R01  S REM3:DRVT.FOR
        CROSS
        NORX3
        NLSTC
        NLIST
$FORT
      SUBROUTINE DRVT(K,TEMP,RE,AMC,CD,DENTT,HI,LLL)
      COMMON /CONST/ RG,PHI,HMSL,AMS,ZB,DI,VB,AM,GSRG,AB
      COMMON /CORIS/ OMEGA,CPH,CPHCZB,CPHSZB,CZB,SPH,SZB
      COMMON /THEO/ Z(3),RZ(3),DZ,X(3),RX(3),DX,Y(3),RY(3),DY,WX,WY
      COMMON /TABL/  IMX,BIASHI(600),
     X  BIASWX(600),BIASWY(600),BIASR(600),BIAST(600),JMX,BIASMC(600)
      IF(K.GE.2) K=LLL+2
      DATA L,DENT/2,0.0/
      HI=RZ(1)+(RX(1)*RX(1)+RY(1)*RY(1))/(2.*RG)+HMSL
      OP=1.+HI/RG
      WTHR=GSRG/(OP**3)
      WTWO=(1.-VB*DENT/AMS)*WTHR
      BX=RX(1)*WTWO
      BY=RY(1)*WTWO
      BZ=(RZ(1)+G)*WTWO
      CX=OMEGA*(RZ(2)*CPHSZB+RY(2)*SPH)
      CY=OMEGA*(RZ(2)*CPHCZB-RX(2)*SPH)
      CZ=-OMEGA*CPH*(RX(2)*SZB+RY(2)*CZB)
      IF(K.EQ.2) GOTO 2
      VEL=SQRT(RZ(2)*RZ(2)+(RX(2)-WX)**2+(RY(2)-WY)**2)
      CALL ATMOS(HI,TEMP,DENT)
      RE=DENT*VEL*DI*(TEMP+110.4)/(1.458E-6*TEMP**1.5)
      AMC=VEL*SQRT(288.16/TEMP)/340.29205
      CALL DRAGT(CD,AMC,RE,IFLAG)
      IF(IFLAG.EQ.200) 100,200
  100 WRITE(6,900) HI
  900 FORMAT(1X,19HWARNING - THEO TRAJ,5X,4HALT=,F10.1/
     X       3X,37HZERO IN DRAG TABLE - PREVIOUS CD USED)
  200 CONTINUE
      E=0.5*DENT*CD*AM*VEL
      DZ=RZ(2)
      DX=RX(2)
      DY=RY(2)
      GOTO 6
    2 DZ=-E*RZ(2)+BZ-CZ
      DX=-E*(RX(2)-WX)+BX-CX
      DY=-E*(RY(2)-WY)+BY-CY
      Z(3)=DZ
      X(3)=DX
      Y(3)=DY
      LLL=1
      DENTT=DENT
    6 RETURN
$ASSM
        LIST
$FORT
      END
```

```
$ASSM
        SCRAT
FITON   PROG  CALL SMOOTHED VEL   14 NOV 79 R01   S REM3:FITON.FOR
        CROSS
        NORX3
        NLSTC
        NLIST
$FORT
      SUBROUTINE FITON
      COMMON /COEF/ PXY1(51),PXY2(35),PZ2(21),PZ1(35)
      COMMON TIME(100),X(100),Y(100),Z(100),TMID(50),XMID(50),YMID(50),
     A ZMID(50),XVM(50),YVM(50),ZVM(50),IX,J,N,MIDMAX,KMAX1,KMAX2,
     B C1,N1ST,NXY1,NZ1,ZXM(50)
      INTEGER*2 IX,J,N,MIDMAX,KMAX1,KMAX2,N1ST,NXY1,NZ1
      INTEGER*2 I,K,NEND
      PX=0.0
      PY=0.0
      PZX=0.
      PZ=0.0
      DO 1 I=1,KMAX1
      PZX=PZX+Z(I)*PXY1(I)
      PX=PX+X(I)*PXY1(I)
    1 PY=PY+Y(I)*PXY1(I)
      NEND=NZ1+N1ST-1
      DO 2 I=N1ST,NEND
      K=I-N1ST+1
    2 PZ=PZ+Z(I)*PZ1(K)
      GO TO 5
      ENTRY FITON2
      PX=0.0
      PZX=0.
      PY=0.0
      PZ=0.0
      DO 3 I=1,KMAX1
    3 PZ=PZ+Z(I)*PZ1(I)
      NEND=NXY1+N1ST-1
      DO 4 I=N1ST,NEND
      K=I-N1ST+1
      PZX=PZX+Z(I)*PXY1(K)
      PX=PX+X(I)*PXY1(K)
    4 PY=PY+Y(I)*PXY1(K)
    5 TMID(N)=TIME(MIDMAX)
      XMID(N)=X(MIDMAX)
      YMID(N)=Y(MIDMAX)
      ZMID(N)=Z(MIDMAX)
      XVM(N)=PX*2.
      YVM(N)=PY*2.
      ZVM(N)=PZ*2.
      ZXM(N)=PZX*2.
      RETURN
$ASSM
        LIST
$FORT
      END
```

```
$ASSM
        SCRAT
INTER   PROG  DATA INTERPOLATION   14 NOV 79 R01  S REM3:INTER.FOR
        CROSS
        NOR:3
        NLSTC
        NLIST
$FOR1
      SUBROUTINE INTER(INTERP,Z2,Z3,IY,IPGE,STALT)
      COMMON /INT/IH,HI,AMC,WE,WN,WT,THETA,PI,RHOOO,T,CD,RE,VRHO,VWX,VWY
     1,PIMR,VP,VT,INTALT,ITIM,CFREQ,TND1,TND2
C     TYPE IH,ITIM, AND INTALT AS INTERGER*4 VAR
      INTEGER*2 INTERP,IY,IPGE,INCREM
      INCREM=200
      IF(INTERP.EQ.2) INCREM=1000
      IF(HI.GT.STALT) GOTO 404
      IF (INTALT) 700,700,701
  700 INTALT=IH/INCREM
      INTALT=INTALT*INCREM
      GO TO 404
  701 IF(INTALT-IH) 404,702,702
  702 INTALT=INTALT
      DELALT=(INTALT-SA1)/(HI-SA1)
      WEIT=SA3+DELALT*(WE-SA3)
      WNIT=SA4+DELALT*(WN-SA4)
      WTIT=SA5+DELALT*(WT-SA5)
      CALL WANGI(TTT,WEIT,WNIT)
      THETIT=TTT
      Z2IT=SA7+DELALT*(Z2-SA7)
      Z3IT=SA8+DELALT*(Z3-SA8)
      CFRQIT=SA20+DELALT*(CFREQ-SA20)
      TND1IT=SA21+DELALT*(TND1-SA21)
      TND2IT=SA22+DELALT*(TND2-SA22)
      VRHOIT=SA17+DELALT*(VRHO-SA17)
      VWXIT=SA18+DELALT*(VWX-SA18)
      VWYIT=SA19+DELALT*(VWY-SA19)
      VTIT=SA10+DELALT*(VT-SA10)
      VPIT=SA9+DELALT*(VP-SA9)
      PIMRIT=SA11*((0.01*PI/SA11)**DELALT)
      RHOIT=1000.0*SA13*((RHOOO/SA13)**DELALT)
      TTIT=SA12+DELALT*(T-SA12)
      CDIT=SA14+DELALT*(CD-SA14)
      IREIT=SA15+DELALT*(RE-SA15)
      AMCIT=SA16+DELALT*(AMC-SA16)
      ALT=INTALT
      TEMP=TTIT
      IF(IPGE.LT.56) GO TO 33
      IPGE=3
      WRITE(IY,401)
  401 FORMAT(1H1,95X,27H***R.M.S. NOISE ERROR IN***/3X,119HTIME     ALT .
```

```
      * EWIND NWIND  SPEED DIR   PRESS   T   DENSITY  Z VEL.  Z ACC     TDE
      *N        CF     DENS  PRES  TEMP  EW   NW/3X,120HZULU   METERS  M/S
      *   M/S    M/S  DEG    MB     K    GR/M3    M/S   M/S2       /CC    .
      *   /S    *****PERCENT*****  M/S  M/S   )
       33 IPGE=IPGE+1
          WRITE (4,900) ALT,TEMP,RHOIT,PIMBIT,WEIT,WNIT
      900 FORMAT(' ',6E10.4)
          WRITE(IY,327) INTALT,WEIT,WNIT,WTIT,IHETIT,PIMBIT,ITIT,RHOIT,Z2IT,
         *Z3IT,TND2IT,CFRQIT,VRHOIT,VPIT,VTIT,VWXIT,VWYIT
      327 FORMAT(9X,           I7,2F6.1,F7.2,2(I4,F9.5),F8.2,F6.2,2(1X,E9.4),
         *3F6.1,2F5.1)
          INTALT=INTALT-INCREM
          GO TO 701
      404 SA1=HI
          SA3=WE
          SA4=WN
          SA5=WT
          SA6=THETA
          SA7=Z2
          SA8=Z3
          SA9=VP
          SA10=VT
          SA11=PIMB
          SA12=T
          SA13=RHOOO
          SA14=CD
          SA15=RE
          SA16=AMC
          SA17=VRHO
          SA18=VWX
          SA19=VWY
          SA20=CFREQ
          SA21=TND1
          SA22=TND2
          RETURN
$ASSM
             LIST
$FORT
          END
```

```
$ASSM
  SCRAT
! INEAR PROG  COMPUTE LINEAR COEFFS  30 NOV 79 R01  S REM3:LINEAR.FOR
  CROSS
  NORX3
  NLSTC
  NLIST
$FORT
      SUBROUTINE LINEAR(NPTS)
      COMMON /COEF/PXY1(51),PXY2(35),PZ2(21),PZ1(51)
      INTEGER*2 NPTS,M,K1,K2,I,M1
      TP=NPTS
      D=((TP-1.)*(TP)*(TP+1.))/12.
      M=(TP-1.)/2.
      M1=M+1
      PZ1(M1)=0.
      DO 20 I=1,M
      K1=M1-I
      K2=M1+I
      PZ1(K2)=I/D
   20 PZ1(K1)=-PZ1(K2)
      RETURN
$ASSM
      LIST
$FORT
      END
```

```
$ASSM
          SCRAT
REAVG     PROG  HALF SEC AVERAGING  14 NOV149 R01    S REM3:REAVG.FOR
          CROSS
          NORX3
          NLSTC
          NLIST
$FORT
      SUBROUTINE REAVG(ICNT,IFLAG3)
      COMMON TIME(100),X(100),Y(100),Z(100),TMID(50),XMID(50),YMID(50),
     A ZMID(50),XVM(50),YVM(50),ZVM(50),IX,J,N,MIDMAX,KMAX1,KMAX2,
     B C1,N1ST,NXY1,NZ1,ZXM(50)
      INTEGER*2 IX,J,N,MIDMAX,KMAX1,KMAX2,N1ST,NXY1,NZ1
      INTEGER*2 I,IFLAG3,ICNT
      IFLAG3=-1
      ST=0.
      SX=0.
      SY=0.
      SZ=0.
      DO 1 I=1,5
C      DATA FROM THE BENCHMARK RUN TAPE Y388
C         AND PROGRAM 8150SERNA*BNCHMRK.PMR
C         PRODUCES DATA LABELED "TIME   X    Y    Z".
C         THE FINAL EDITED DATA CORRESPONDING TO
C         TO "X" (S1) IS USED FOR CALCULATING
C         Y(J), AND DATA CORRESPONDING TO "Y"
C         (S2) FOR X(J).
C      THIS PROGRAM WILL FOLLOW THIS CONVENTION
C         IN THE STATEMENTS BETWEEN LABELS 5 AND 1.
C      DATA READ S1=X,S2=Y,S3=Z
      READ(1,5,END=2) T,S1,S2,S3
    5 FORMAT(4E18.7)
      ST=ST+T
      SX=SX+S2
      SY=SY+S1
    1 SZ=SZ+S3
      TIME(J)=0.2*ST
      X(J)=.06096*SX
      Y(J)=.06096*SY
      Z(J)=.06096*SZ
      RETURN
    2 IFLAG3=0
      RETURN
$ASSM
         LIST
$FORT
      END
```

```
$ASSM
        SCRAT
REAVGT  PROG  THEORETICAL AVGING  14 NOV 79 R01.  S REM3:REAVGT.FOR
        CROSS
        NORX3
        NLSTC
        NLIST
$FORT
      SUBROUTINE REAVGT(IFLAG4)
      COMMON /THEO/ZT(3),RZ(3),DZ,XT(3),RX(3),DX,YT(3),RY(3),
     X DY,WX,WY
      COMMON TIME(100),X(100),Y(100),Z(100),TMID(50),XMID(50),YMID(50),
     A ZMID(50),XVM(50),YVM(50),ZVM(50),IX,J,N,MIDMAX,KMAX1,KMAX2,
     B C1,N1ST,NXY1,NZ1,ZXM(50)
      INTEGER*2 IX,J,N,MIDMAX,KMAX1,KMAX2,N1ST,NXY1,NZ1
      INTEGER*2 I,IFLAG4
      IFLAG4=-1
      ST=0.0
      SX=0.0
      SY=0.0
      SZ=0.0
      DO 1 I=1,5
      CALL THEOT(T)
      IF(T.EQ.-999.9) GO TO 10
      ST=ST+T
      SX=SX+XT(1)
      SY=SY+YT(1)
    1 SZ=SZ+ZT(1)
      TIME(J)=0.2*ST
      X(J)=0.2*SX
      Y(J)=0.2*SY
      Z(J)=0.2*SZ
      RETURN
   10 IFLAG4=0
      RETURN
$ASSM
        LIST
$FORT
      END
```

```
$ASSM
          SCRAT
SLIDE     PROG  MOVE DATA 1 PT  14 NOV 79 R01  S RFM3:SLIDF.FOR
          CROSS
          NORX3
          NLSTC
          NLIST
$FORT
      SUBROUTINE SLIDE(IB,ICNT,IFLAG5)
      COMMON TIME(100),X(100),Y(100),Z(100),TMID(50),XMID(50),YMID(50),
     A ZMID(50),XVM(50),YVM(50),ZVM(50),IX,J,N,MIDMAX,KMAX1,KMAX2,
     B C1,N1ST,NXY1,NZ1,ZXM(50)
      INTEGER*2 IX,J,N,MIDMAX,KMAX1,KMAX2,N1ST,NXY1,NZ1
      INTEGER*2 I,IA,IC,ICNT,IFLAG3,IFLAG5
      IFLAG5=-1
      IA=KMAX1-IB
      DO 110 I=1,IA
      IC=I+IB
      X(I)=X(IC)
      Y(I)=Y(IC)
      Z(I)=Z(IC)
  110 TIME(I)=TIME(IC)
      IC=IA+1
      DO 111 J=IC,KMAX1
  111 CALL REAVG(ICNT,IFLAG3)
      IF(IFLAG3)114,112,113
  114 RETURN
  112 IFLAG5=0
      RETURN
  113 IFLAG5=1
      RETURN
$ASSM
          LIST
$FORT
      END
```

```
$ASSM
          SCRAT
SLIDET    PROG  MOVE TDATA 1 PT  14 NOV 79 R01.  S REM3:SLIDET.FOR
          CROSS
          NORX3
          NLSTC
          NLIST
$FORT
      SUBROUTINE SLIDET(IB,IFLAG6)
      COMMON TIME(100),X(100),Y(100),Z(100),TMID(50),XMID(50),YMID(50),
     A ZMID(50),XVM(50),YVM(50),ZVM(50),IX,J,N,MIDMAX,KMAX1,KMAX2,
     B C1,N1ST,NXY1,NZ1,ZXM(50)
      INTEGER*2 IX,J,N,MIDMAX,KMAX1,KMAX2,N1ST,NXY1,NZ1
      INTEGER*2 I,IA,IC,IFLAG4,IFLAG6
      IFLAG6= -1
      IA=KMAX1-IB
      DO 110 I=J,IA
      IC=I+IB
      X(I)=X(IC)
      Y(I)=Y(IC)
      Z(I)=Z(IC)
  110 TIME(I)=TIME(IC)
      IC=IA+1
      DO 111 J=IC,KMAX1
  111 CALL REAVGT(IFLAG4)
      IF(IFLAG4)113,112,113
  113 RETURN
  112 IFLAG6=0
      RETURN
$ASSM
          LIST
$FORT
      END
```

```
$ASSM
          SCRAT
TAB       PROG  CONSTR PRNT PLOT  14 NOV 79 R01  S RFM3:TAB.FOR
          CROSS
          NORX3
          NLSTC
          NLIST
$FORT
      SUBROUTINE TAB(FSALT,IY)
      INTEGER*2 I,IY,J
      DIMENSION DEN(5,8),WIND(5,8)
      DATA ZERO/' -- '/
      DATA DEN    / 3*4H0.01 , 4H0.47 , 4H0.94,
     X              2*4H0.01 , 4H0.02 , 4H0.51, 4H0.95 ,
     X              2*4H0.01 , 4H0.03 , 4H0.59, 4H0.96 ,
     X                 4H0.01 , 4H0.04 , 4H0.47, 4H0.72 , 4H0.98 ,
     X                 4H0.01 , 4H0.22 , 4H0.84, 4H0.97 , 4H0.99 ,
     X                 4H0.22 , 4H0.52 , 4H0.90, 4H0.98 , 4H0.99 ,
     X                 4H0.42 , 4H0.80 , 4H0.96, 4H0.99 , 4H0.99  ,
     X                 4H0.75 , 4H0.90 , 4H0.99, 4H0.99 , 4H0.99 /
      DATA WIND   /    4H0.01 , 4H0.01 , 4H0.02, 4H0.14 , 4H0.58 ,
     X                 4H0.01 , 4H0.01 , 4H0.03, 4H0.17 , 4H0.63 ,
     X                 4H0.01 , 4H0.01 , 4H0.06, 4H0.24 , 4H0.66 ,
     X                 4H0.01 , 4H0.03 , 4H0.18, 4H0.85 , 4H0.90 ,
     X                 4H0.01 , 4H0.10 , 4H0.70, 4H0.97 , 4H0.98 ,
     X                 4H0.02 , 4H0.40 , 4H0.98, 4H0.99 , 4H0.99 ,
     X                 4H0.57 , 4H0.76 , 4H0.99, 4H0.99 , 4H0.99 ,
     X                 4H0.96 , 4H0.99 , 4H0.99, 4H0.99 , 4H0.99 /
  100 FORMAT(1H1,20X,68HRATIO OF AMPLITUDE OF SMOOTHED DENSITY WAVE TO A
     1MPLITUDE OF ORIGINAL/32X,46HWAVE AS A FUNCTION OF ALTITUDE AND WAV
     2ELENGTH. /29X,50H(ALTITUDE AND WAVELENGTH MEASURED IN KILOMETERS. )
     1//)
  101 FORMAT(20X,62HRATIO OF AMPLITUDE OF SMOOTHED SINUSOIDAL WIND TO AM
     1PLITUDE OF/23X,55HORIGINAL WIND AS A FUNCTION OF ALTITUDE AND WAVE
     2LENGTH. /29X,50H(ALTITUDE AND WAVELENGTH MEASURED) IN KILOMETERS. )
     3//)
  102 FORMAT(46X,8HALTITUDE//26X,57HX 100  X  90  X  80  X  70  X  60  X
     1  50  X  40  X  30  X/26X,57(1HX)/20X,7HW      X,8(6X,1HX)/20X,7HA.
     2  1 X,8(A6,1HX)/20X,7HV      X,8(6X,1HX)/20X,7HE    2 X,8(A6,1HX)/20
     3X,7HL      X,8(6X,1HX)/20X,7HE    5 X,8(A6,1HX)/20X,7HN      X,8(6X,1
     4HX)/20X,7HG  10 X,8(A6,1HX)/20X,7HT      X,8(6X,1HX)/20X,7HH  20 X,
     58(A6,1HX)//////////)
       WRITE(IY,100)
       IF(FSALT.GT.75.) GO TO 20
    10 WRITE(IY,102) (ZERO,ZERO,ZERO,ZERO,(DEN(I,J),J=5,8),I=1,5)
       WRITE(IY,101)
       WRITE(IY,102) (ZERO,ZERO,ZERO,ZERO,(WIND(I,J),J=5,8),I=1,5)
       RETURN
    20 IF(FSALT.GT.90.) GO TO 30
       WRITE(IY,102) (ZERO,ZERO,ZERO,(DEN(I,J),J=4,8),I=1,5)
```

```
51            WRITE(IY,101)
52            WRITE(IY,102) (ZERO,ZERO,ZERO,(WIND(I,J),J=4,8),I=1,5)
53            RETURN
54         30 IF(ESALT.GT.100.)  GO TO 40
55            WRITE(IY,102) (ZERO,ZERO,(DEN(I,J),J=3,8),I=1,5)
56            WRITE(IY,101)
57            WRITE(IY,102) (ZERO,ZERO,(WIND(I,J),J=3,8),I=1,5)
58            RETURN
59         40 IF(ESALT.GT.110.) GO TO 50
60            WRITE(IY,102) (ZERO,(DEN(I,J),J=2,8),I=1,5)
61            WRITE(IY,101)
62            WRITE(IY,102) (ZERO,(WIND(I,J),J=2,8),I=1,5)
63            RETURN
64         50 WRITE(IY,102) ((DEN(I,J),J=1,8),I=1,5)
65            WRITE(IY,101)
66            WRITE(IY,102) ((WIND(I,J),J=1,8),I=1,5)
67            RETURN
68      $ASSM
69               LIST
70      $FORT
71            END
```

```
$ASSM
        SCRAT
THEOT   PROG  COMP THEO TRAJEC  14 NOV 79 R01  S REM3:THEOT.FOR
        CROSS
        NORX3
        NLSTC
        NLIST
$FORT
      SUBROUTINE THEOT(T)
      INTEGER*2 I1,K,U,IU
      COMMON /CONST/ RG,PHI,HMSL,AMS,ZB,DI,VB,AM,GSRG,AB
      COMMON /THEO/ Z(3),RZ(3),DZ,X(3),RX(3),DX,Y(3),RY(3),DY,WX,WY
      DIMENSION A(4),B(4),PZ(2),PX(2),PY(2),QZ(2),QX(2),QY(2)
      DATA A,B/0.0,0.5,0.5,1.0,1.0,2.0,2.0,1.0/,IU/0/
      IF(IU.NE.0) GO TO 2
      T=0.
      IU=1.
    2 DO 1 K=1,2
      PZ(K)=0.0
      PX(K)=0.0
      PY(K)=0.0
      QZ(K)=0.0
      QX(K)=0.0
    1 QY(K)=0.0
      H=0.1
      DO 6 U=1,4
      DO 7 K=1,2
      RZ(K)=Z(K)+A(U)*PZ(K)
      RX(K)=X(K)+A(U)*PX(K)
    7 RY(K)=Y(K)+A(U)*PY(K)
      DO 6 K=1,2
      CALL DRVT(K,A1,A2,A3,A4,A5,A6,I1)
      PZ(K)=DZ*H
      PX(K)=DX*H
      PY(K)=DY*H
      QZ(K)=QZ(K)+B(U)*PZ(K)
      QX(K)=QX(K)+B(U)*PX(K)
      QY(K)=QY(K)+B(U)*PY(K)
    6 CONTINUE
      DO 8 K=1,2
      Z(K)=Z(K)+QZ(K)/6.
      X(K)=X(K)+QX(K)/6.
    8 Y(K)=Y(K)+QY(K)/6.
      T=T+H
      TALT=Z(1)+(X(1)*X(1)+Y(1)*Y(1))/(2*RG)+HMSL
      IF(TALT.GT.55000.) GO TO 10
      T=-999.9
      IU=0
   10 RETURN
$ASSM
        LIST
$FORT
      END
```

```
$ASSM
          SCRAT
TIFALL    PROG  CHK SPH1 COLLAPSE  14 NOV 79 R01  S REM3:TIFALL.FOR
          CROSS
          NORX3
          NLSIC
          NLIST
$FORT
      SUBROUTINE TIFALL(HI,TFT,IFT,ZVM,HI2,COLAPS,IPGE,IY)
      INTEGER*2 IFT,IH2,IPGE,IY,JFT
      COMMON /TF/TFT1,TFT2,TFT3,TFT4,TFT5,TFT6,TFT7,TFT8,TFT9,TFT0
      DIMENSION ZVM(50)
      GO TO (399,302,306,350,464,312,325,360,356,362,351),IFT
  302 IF(ZVM(2).LT.ZVM(1)) GO TO 303
  412 IFT=5
      JFT=1
      WRITE(IY,411)
  411 FORMAT(20X,58HAPOGEE NOT KNOWN.  TIME OF FALL TEST NOT USED ABOVE 5
     *5 KM.    )
      IPGE=IPGE+1
      GO TO 399
  303 IF (HI-77900.) 350,304,304
  304 IF (ZVM(1)+200.) 412,305,305
  305 IFT=3
      GO TO 399
  306 IF (ZVM(1)-ZVM(2)) 412,412,307
  307 IF (ZVM(1)+200.) 308,308,399
  308 IFT=5
      HI2=HI/1000.+2.1
      IH2=HI2
      HI3=IH2
      IF (HI2-HI3-.5) 309,310,310
  309 HI2=IH2
      GO TO 311
  310 HI2=IH2+1
      IH2=HI2
  311 WRITE(IY,413) IH2
  413 FORMAT(1H ,20X,16HBALLOON APOGEE =,I4,4H KM.)
      IPGE=IPGE+1
      IFT=6
      RETURN
  312 IF(TFT2.EQ.0.0)RETURN
      IF (HI2-100.) 300,301,313
  313 IF(HI2-125.) 314,318,319
  314 IF(HI2-115.) 315,316,317
  300 IFT=7
      GO TO 325
  301 TTEST=29.
      GO TO 323
  315 TTEST=25.+4.*(115.-HI2)/15.
```

```
      GO TO 323
  316 TTEST=25.
      GO TO 323
  317 TTEST=24. +(125. -HI2)/10.
      GO TO 323
  318 TTEST=24.
      GO TO 323
  319 IF(HI2-140. ) 320, 321, 322
  320 TTEST=22. +3. *(140. -HI2)/15.
      GO TO 323
  321 TTEST=22.
      GO TO 323
  322 TTEST=21. +(150. -HI2)/10.
  323 IF(TFT. LT. TTEST+3. . AND. TFT. GT. TTEST-3. ) GO TO 324
      WRITE(IY, 414)
  414 FORMAT(20X, 76HTIME OF FALL TEST BETWEEN 80 AND 70 KM.  INDICATES BA
     *LLOON DID NOT INFLATE.    )
      IF(COLAPS. EQ. 0. ) COLAPS=70000.
      IPGE=IPGF+1
      IFT=7
      RETURN
  324 WRITE(IY, 415)
  415 FORMAT(20X, 32HBALLOON STILL INFLATED AT 70 KM.   )
      IPGE=IPGE+1
      IFT=7
      RETURN
  325 IF(TFT3. EQ. 0. 0) RETURN
      IF(TFT. LT. 52. . AND. TFT. GT. 44. ) GO TO 326
      WRITE(IY, 416)
  416 FORMAT(20X, 57HTIME OF FALL TEST BETWEEN 70 AND 60 KM.  INDICATES CO
     AL APSE)
      IF(COLAPS. EQ. 0. ) COLAPS=60000.
      IPGE=IPGF+1
      IFT=8
      RETURN
  326 WRITE(IY, 417)
  417 FORMAT(20X, 32HBALLOON STILL INFLATED AT 60 KM.   )
      IPGF=IPGE+1
      IFT=8
      RETURN
  350 IFT=4
      IF(ZVM(1). LT. -150. ) GO TO 355
      IFT=11
      RETURN
  351 IF(ZVM(2). GT. ZVM(1)) GO TO 412
      IF(ZVM(1). GT. -150. ) RETURN
      IFT=8
      HI2=HI/1000. +1. 5
      IH2=HI2
      HI3=IH2
```

```
101           IF(HI2-HI3-.5) 352,353,353
102         352 HI2=IH2
103           GO TO 354
104         353 HI2=IH2+1
105           IH2=HI2
106         354 WRITE(IY,413) IH2
107           IPGE=IPGE+1
108           GO TO 360
109         355 IF(ZVM(1).LT.-210.) GO TO 412
110           IFT=9
111           RETURN
112         356 IF(ZVM(2).GT.ZVM(1)) GO TO 412
113           IF(ZVM(1).GT.-210.) RETURN
114           HI2=HI/1000.+2.1
115           IH2=HI2
116           HI3=IH2
117           IF(HI2-HI3-.5) 357,358,358
118         357 HI2=IH2
119           GO TO 359
120         358 HI2=IH2+1
121           IH2=HI2
122         359 WRITE(IY,413) IH2
123           IPGE=IPGE+1
124         360 IF(TFT4.EQ.0.0) RETURN
125           IFT=10
126           IF(TFT.LT.39..AND.TFT.GT.31.) GO TO 361
127           WRITE(IY,418)
128         418 FORMAT(20X,57HTIME OF FALL TEST BETWEEN 60 AND 55 KM.  INDICATES CO
129          ALAPSE    )
130           IF(COLAPS.EQ.0.) COLAPS=55000.
131           IPGE=IPGE+1
132           RETURN
133         361 WRITE(IY,419)
134         419 FORMAT(20X,32HBALLOON STILL INFLATED AT 55 KM.    )
135           IPGE=IPGE+1
136           RETURN
137         464 GO TO (362,365,367,369,371),JFT
138         362 IF(TFT5.EQ.0.0) RETURN
139           IFT=5
140           JFT=2
141           IF(TFT.LT.54..AND.TFT.GT.44.) GO TO 363
142           WRITE(IY,420)
143         420 FORMAT(20X,57HTIME OF FALL TEST BETWEEN 55 AND 50 KM.  INDICATES CO
144          ALAPSE    )
145           IF(COLAPS.EQ.0.) COLAPS=50000.
146           IPGE=IPGE+1
147           RETURN
148         363 WRITE(IY,421)
149         421 FORMAT(20X,32HBALLOON STILL INFLATED AT 50 KM.    )
150           IPGE=IPGE+1
```

```
      399 RETURN
      365 IF (TFT7.LE.0.0) GO TO 399
          JFT=3
          IPGE=IPGF+1
          IF(TFT.LT.74..AND.TFT.GT.60.) GO TO 366
          WRITE(IY,422)
      422 FORMAT(20X,57HTIME OF FAIL TEST BETWEEN 50 AND 45 KM.  INDICATES CO
         *LAPSE    )
          IF(COLAPS.EQ.0.0) COLAPS=45000.
          GO TO 399
      366 WRITE(IY,423)
      423 FORMAT(20X,32HBALLOON STILL  INFLATED AT 45 KM.    )
          GO TO 399
      367 IF (TFT8.LE.0.0) GO TO 399
          JFT=4
          IPGE=IPGF+1
          IF(TFT.LT.106..AND.TFT.GT.84.) GO TO 368
          WRITE(IY,424)
      424 FORMAT(20X,57HTIME OF FALL TEST BETWEEN 45 AND 40 KM.  INDICATES CO
         *LAPSE    )
          IF(COLAPS.EQ.0.0) COLAPS=40000.
          GO TO 399
      368 WRITE(IY,425)
      425 FORMAT(20X,32HBALLOON STILL INFLATED AT 40 KM.    )
          GO TO 399
      369 IF (TFT9.LE.0.0) GO TO 399
          JFT=5
          IPGE=IPGE+1
          IF(TFT.LT.156..AND.TFT.GT.124.) GO TO 370
          WRITE(IY,426)
      426 FORMAT(20X,57HTIME OF FALL TEST BETWEEN 40 AND 35 KM.  INDICATES CO
         *LAPSE    )
          IF(COLAPS.EQ.0.0) COLAPS=35000.
          GO TO 399
      370 WRITE(IY,427)
      427 FORMAT(20X,32HBALLOON STILL INFLATED AT 35 KM.    )
          GO TO 399
      371 IF (TFT0.LE.0.0) GO TO 399
          IFT=1
          IPGE=IPGE+1
          IF(TFT.LT.232..AND.TFT.GT.198.) GO TO 372
          WRITE(IY,428)
      428 FORMAT(20X,57HTIME OF FALL TEST BETWEEN 35 AND 30 KM.  INDICATES CO
         *LAPSE    )
          IF(COLAPS.EQ.0.0) COLAPS=30000.
          GO TO 399
      372 WRITE(IY,429)
      429 FORMAT(20X,32HBALLOON STILL INFLATED AT 30 KM.    )
          GO TO 399
$ASSM
          LIST
$FORT
          END
```

```
$ASSM
          SCRAT
TIFAL2    PROG  CHK SPH2 COLLAPSE  14 NOV 79 R01  S REM3:TIFAL2.FOR
          CROSS
          NORX3
          NLSTC
          NLIST
$FORT
      SUBROUTINE TIFAL2(HI,TFT,IFT,ZVM,HI2,COLAPS,IPGE,IY)
      INTEGER*2 IFT,JFT,IH2,IPGE,IY
      COMMON /TF/TFT1,TFT2,TFT3,TFT4,TFT5,TFT6,TFT7,TFT8,TFT9,TFT0
      DIMENSION ZVM(50)
      GO TO (399,302,306,350,464,312,325,360,356,362,351),IFT
  302 IF(ZVM(2).LT.ZVM(1)) GO TO 303
  412 IFT=5
      JFT=1
      WRITE(IY,411)
  411 FORMAT(20X,58HAPOGEE NOT KNOWN.  TIME OF FALL TEST NOT USED ABOVE 5
     *5 KM     )
      IPGE=IPGE+1
      GO TO 399
  303 IF (HI-77900.) 350,304,304
  304 IF (ZVM(1)+200.) 412,305,305
  305 IFT=3
      GO TO 399
  306 IF (ZVM(1)-ZVM(2)) 412,412,307
  307 IF (ZVM(1)+200.) 308,308,399
  308 IFT=5
      HI2=HI/1000.+2.1
      IH2=HI2
      HI3=IH2
      IF (HI2-HI3-.5) 309,310,310
  309 HI2=IH2
      GO TO 311
  310 HI2=IH2+1.
      IH2=HI2
  311 WRITE(IY,413) IH2
  413 FORMAT(1H ,20X,16HBALLOON APOGEE =,I4,4H KM.)
      IPGE=IPGE+1
      IFT=6
      RETURN
  312 IF(TFT2.EQ.0.0) RETURN
      TTEST=23.
      IF(TFT.LT.TTEST+5..AND.TFT.GT.TTEST-5.) GO TO 324
      WRITE(IY,414)
  414 FORMAT(20X,76HTIME OF FALL TEST BETWEEN 80 AND 70 KM.  INDICATES BA
     *LLOON DID NOT INFLATE.    )
      IF(COLAPS.EQ.0.) COLAPS=70000.
      IPGE=IPGE+1
      IFT=7
```

```
      RETURN
  324 WRITE(IY,415)
  415 FORMAT(20X,32HBALLOON STILL INFLATED AT 70 KM.   )
      IPGE=IPGE+1
      IFT=7
      RETURN
  325 IF(TFT3.EQ.0.0) RETURN
      IF(TFT.LT.46..AND.TFT.GT.38.)GO TO 326
      WRITE(IY,416)
  416 FORMAT(20X,57HTIME OF FALL TEST BETWEEN 70 AND 60 KM.  INDICATES CO
     ALAPSE)
      IF(COLAPS.EQ.0.) COLAPS=60000.
      IPGE=IPGE+1
      IFT=8
      RETURN
  326 WRITE(IY,417)
  417 FORMAT(20X,32HBALLOON STILL INFLATED AT 60 KM.   )
      IPGE=IPGE+1
      IFT=8
      RETURN
  350 IFT=4
      IF(ZVM(1).LT.-150.) GO TO 355
      IFT=11
      RETURN
  351 IF(ZVM(2).GT.ZVM(1)) GO TO 412
      IF(ZVM(1).GT.-150.) RETURN
      IFT=8
      HI2=HI/1000.+1.5
      IH2=HI2
      HI3=IH2
      IF(HI2-HI3-.5) 352,353,353
  352 HI2=IH2
      GO TO 354
  353 HI2=IH2+1
      IH2=HI2
  354 WRITE(IY,413) IH2
      IPGE=IPGE+1
      GO TO 360
  355 IF(ZVM(1).LT.-210.) GO TO 412
      IFT=9
      RETURN
  356 IF(ZVM(2).GT.ZVM(1)) GO TO 412
      IF(ZVM(1).GT.-210.) RETURN
      HI2=HI/1000.+2.1
      IH2=HI2
      HI3=IH2
      IF(HI2-HI3-.5) 357,358,358
  357 HI2=IH2
      GO TO 359
  358 HI2=IH2+1
```

```
      IH2=HI2
  359 WRITE(IY,413) IH2
      IPGE=IPGE+1
  360 IF(TFT4.EQ.0.0) RETURN
      IFT=10
      IF(TFT.LT.35..AND.TFT.GT.27.)GO TO 361
      WRITE(IY,418)
  418 FORMAT(20X,57HTIME OF FALL TEST BETWEEN 60 AND 55 KM.  INDICATES CO
     ALAPSE    )
      IF(COLAPS.EQ.0.) COLAPS=55000.
      IPGE=IPGE+1
      RETURN
  361 WRITE(IY,419)
  419 FORMAT(20X,32HBALLOON STILL INFLATED AT 55 KM.    )
      IPGE=IPGE+1
      RETURN
  464 GO TO (362,365,367,369,371),JFT
  362 IF(TFT5.EQ.0.0) RETURN
      IFT=9
      JFT=2
      IF(TFT.LT.47..AND.TFT.GT.36.)GO TO 363
      WRITE(IY,420)
  420 FORMAT(20X,57HTIME OF FALL TEST BETWEEN 55 AND 50 KM.  INDICATES CO
     ALAPSE    )
      IF(COLAPS.EQ.0.) COLAPS=50000.
      IPGE=IPGE+1
      RETURN
  363 WRITE(IY,421)
  421 FORMAT(20X,32HBALLOON STILL INFLATED AT 50 KM.    )
      IPGE=IPGE+1
      RETURN
  365 IF(TFT7.LE.0.0) GO TO 399
      JFT=3
      IPGE=IPGE+1
      IF(TFT.LT.65..AND.TFT.GT.50.) GO TO 366
      WRITE(IY,422)
  422 FORMAT(20X,57HTIME OF FALL TEST BETWEEN 50 AND 45 KM.  INDICATES CO
     *LAPSE    )
      IF(COLAPS.EQ.0.0) COLAPS=45000.
      GO TO 399
  366 WRITE(IY,423)
  423 FORMAT(20X,32HBALLOON STILL INFLATED AT 45 KM.    )
      GO TO 399
  367 IF(TFT8.LE.0.0) GO TO 399
      JFT=4
      IPGE=IPGE+1
      IF(TFT.LT.93..AND.TFT.GT.72.) GO TO 368
      WRITE(IY,424)
  424 FORMAT(20X,57HTIME OF FALL TEST BETWEEN 45 AND 40 KM.  INDICATES CO
     *LAPSE    )
```

```
151           IF(COLAPS.EQ.0.0) COLAPS=40000.
152           GO TO 399
153       368 WRITE(IY,425)
154       425 FORMAT(20X,32HBALLOON STILL INFLATED AT 40 KM.   )
155           GO TO 399
156       369 CONTINUE
157       371 CONTINUE
158           GO TO 399
159     $ASSM
160              LIST
161     $FORT
162           END
```

```
$RT-SM
          SCRAT
TROBIN    PROG  THEORECT SPH TRAJ  30 NOV 79 R01  S REM3:TROBIN.FOR
          CROSS
          NORX3
          NLSTC
          NLIST
*FDT
      SUBROUTINE TROBIN(GS,N2MID,KSW2,KSW,IPGF,IY)
      INTEGER*2 ICD,IFLAG,IFLAG1,IFLAG6,IPGE,ISN,IY
      INTEGER*2 KSN,KSW2,NPRT,N2MID,JB,IMX,JMX
      INTEGER*2 IX,J,N,MIDMAX,KMAX1,KMAX2,N1ST,NXY1,NZ1
      INTEGER*2 I,K,NXY2,NZ2,NX1MID,NX2MID,NZ1MID,NZ2MID,N2ST
      COMMON /EXTRA/ NXY2,NZ2,NX1MID,NX2MID,NZ1MID,NZ2MID,N2ST
      COMMON /COEF/  PXY1(51),PXY2(35),PZ2(21),PZ1(51)
      COMMON /CONST/ RG,ALA,HMSL,AMS,ZB,DIA,VB,AM,GSRG,AB
      COMMON /CORI2/ TOSL,TOCL,TOCLS2,TOCLC2
      COMMON /CON2/  AMK,ALPHA,PU,RAD
      COMMON /TABL/ IMX,BIASHI(600),BIASNX(600),BIASNY(600),
     X BIASZ(600),BIAST(600),JMX,BIASMC(600)
      COMMON /  / TIME(100),X(100),Y(100),Z(100),TMID(50),XMID(50),
     X            YMID(50),ZMID(50),XVM(50),YVM(50),ZVM(50),IX,J,N,
     X            MIDMAX,KMAX1,KMAX2,C1,N1ST,NXY1,
     X            NZ1,ZXM(50)
        TB=0
        ISN=1
        I(2)=1
        NZ1=0.0
        NPRT=0
  1001  DO 22 J=1,KMAX1
        CALL REAVGT(IFLAG1)
        IF(IFLAG1)6,90,6
      6 GO TO (7,9),KSW2
      7 DO 8 K=1,KMAX2
        N=K
        CALL FITON
        CALL SLIDE1(2,IFLAG6)
        IF(IFLAG6)8,90,8
      8 CONTINUE
        GO TO 11
      9 DO 10 K=1,KMAX2
        N=K
        CALL FITON2
        CALL SLIDE1(2,IFLAG6)
        IF(IFLAG6)10,90,10
     10 CONTINUE
     11 X3=0.0
        ZX=0.0
        Y3=0.0
        Z3=0.0
```

```
      GO TO (12,15),KSN
   12 DO 13 I=1,NXY2
      Z3X=Z3X+PXY2(I)*ZXM(I)
      X3=X3+PXY2(I)*XVM(I)
   13 Y3=Y3+PXY2(I)*YVM(I)
      NEND=N2ST+NZ2 -1
      DO 14 I=N2ST,NEND
      K=I-N2ST+1
   14 Z3=Z3+PZ2(K)*ZVM(I)
      GO TO 18
   15 DO 16 I=1,NZ2
   16 Z3=Z3+PZ2(I)*ZVM(I)
      NEND=NXY2+N2ST -1
      DO 17 I=N2ST,NEND
      K=I-N2ST+1
      Z3X=Z3X+PXY2(K)*ZXM(I)
      X3=X3+PXY2(K)*XVM(I)
   17 Y3=Y3+PXY2(K)*YVM(I)
   18 CONTINUE
      X2=XVM(N2MID)
      Y2=YVM(N2MID)
      Z2X=ZXM(N2MID)
      Z2=ZVM(N2MID)
      X1=XMID(N2MID)
      Y1=YMID(N2MID)
      Z1=ZMID(N2MID)
      TIM=TMID(N2MID)
      HI=Z1+(X1*X1+Y1*Y1)/(2.*RG)+HMSL
      OPHOR=1.0+HI/RG
      WTHR=GS/(RG*OPHOR*OPHOR*OPHOR)
      IF(Z3.LT.-8.0) GO TO 2050
      CORX=TOCLSZ*Z2X+TOSL*Y2
      CORY=TOCLCZ*Z2X-TOSL*X2
      CORZ=-TOCLSZ*X2-TOCLCZ*Y2
      GO TO (19,38),ISW
   19 CALL ATMOS(HI,T,RHOO)
      ICD=5
      VT=ABS(Z2)*SQRT(1.0+(X3*X3+Y3*Y3)/(Z3-WTHR*(Z1+RG))**2)
      RE=DIA*RHOO*VT*(T+110.4)/(0.000001458*SQRT(T*T*T))
      AMC=VT*(SQRT(288.16/T))/340.2905
      CALL DRAGT(CD,AMC,RE,IFLAG)
      IF(IFLAG)34,2000,34
   34 ICD=1
      CD1=CD
      RHOOO=RHOO
      RHO=RHOO
      GO TO 20
   38 DCD=CD
      CD=2.0*CD-CD1
      CD1=DCD
```

```
      20 WTWO=(1.0-VB*RHO/AMS)*WTHR
         BOUYX=X1*WTWO
         BOUYY=Y1*WTWO
         BOUYZ=(Z1+RG)*WTWO
      21 WDENOM=Z2X+CORZ-BOUYZ
      22 WZ=WZ1
         WX=X2-(Z2X-WZ)*(X3+CORX-BOUYX)/WDENOM
         WY=Y2-(Z2X-WZ)*(Y3+CORY-BOUYY)/WDENOM
         WZ1=-(X1+WX+Y1*WY)/(HI+RG)
         IF(ABS(WZ1-WZ).GE.0.1) GO TO 22
         WZ=WZ1
         VT=SQRT((X2-WX)**2+(Y2-WY)**2+(Z2-WZ)**2)
         RHO=AMS*(-CORZ-Z3+WTHR*(RG+Z1))/(CD*AR*VT*(Z2-WZ)+WTHR*(RG+Z1)*VB)
         GO TO (23,24),ISW
      23 PI=T*RU*RHO/AMK
         GO TO 25
      24 PI=PII+GS*RG**2*(HI-HII)*EXP(0.5*ALOG(RHO*RHOOO))/((RG+0.5*(HI+HII
        A ))**2)
         T=PI*AMK/(RU*RHO)
      25 AMC=VT*(SQRT(788.16/T))/340.29205
         RE=DIA*RHO*VT*(T+110.4)/(0.00000145*SQRT(T**3))
         CD0=CD
         CALL DRAGT(CD,AMC,RE,IFLAG)
         IF(IFLAG)33,2000,33
      33 ICD=J
         IF(NPRT.EQ.0) GO TO 26
         CD=CD0+(CD-CD0)/3.
         IF(ABS(RHO-RHOO)/RHO.LT.0.003333) GO TO 28
         IF(NPRT.GE.5) GO TO 27
      26 RHOO=RHO
         NPRT=NPRT+1
         GO TO 20
      27 RHO=(RHO+RHOO)/2.0
         CD=(CD+CD0)/2.0
         NPRT=0
         GO TO 20
      28 RHOOO=RHO
         NPRT=0
         RHOO=RHO
         PII=PI
         HII=HI
         IF(Z3.LT.-8.0) GO TO 2050
         ISW=2
         CALL ATMOS(HI,TSS,RSS)
         JB=JB+1
         IF(JB.GT.600) GO TO 2000
         BIASHI(JB)=HI
         BIASMC(JB)=AMC
         BIASWX(JB)=WX
         BIASWY(JB)=WY
```

```
151           BIASR(JB)=RHO-RSS
152           BIAST(JB)=T-TSS
153           JMX=JB
154           GOTO 2000
155     2000  ICD=ICD+1
156           IF(ICD.LE.5) GO TO 2050
157           ICD=1
158           ISN=1
159      2050 CONTINUE
160           NPRT=0
161        32 K=KMAX2-1
162           DO 31 I=1,K
163           XMID(I)=XMID(I+1)
164           YMID(I)=YMID(I+1)
165           ZMID(I)=ZMID(I+1)
166           TMID(I)=TMID(I+1)
167           XVM(I)=XVM(I+1).
168           YVM(I)=YVM(I+1)
169           ZXM(I)=ZXM(I+1)
170        31 ZVM(I)=ZVM(I+1)
171           GO TO (29,30),KSN2
172        29 N=KMAX2
173           CALL  FITON
174           CALL  SLIDET(2,IFLAG6)
175           IF(IFLAG6)11,90,11
176        30 N=KMAX2
177           CALL FITON2
178           CALL SLIDET(2,IFLAG6)
179       240 IF(IFLAG6)11,90,11
180        90 CONTINUE
181           RETURN
182     $ASSM
183              LIST
184     $FORT
185           END
```

```
$ASSM
          SCRAT
WANGL     PROG  POLAR WIND COORD  14 NOV 79 R01  S REM3:WANGL.FOR
          CROSS
          NORX3
          NLSTC
          NLIST
$FORT
      SUBROUTINE WANGL(THETA,WE,WN)
      INTEGER*2 I,NEND,N2MID
      RAD=57.2957795
      IF (WE)1003,1002,1001
 1001 IF(WN)1011,1011,1010
 1002 IF(WN)1014,1014,1010
 1003 IF(WN)1013,1012,1012
 1010 TH=3.1415927+ATAN (WE/WN)
      GO TO 1018
 1011 TH=4.7123890+ATAN (-WN/WE)
      GO TO 1018
 1012 TH=1.5707963+ATAN (-WN/WE)
      GO TO 1018
 1013 TH=ATAN (WE/WN)
      GO TO 1018
 1014 TH=0.0
 1018 THETA=(TH)*(RAD)
      RETURN
$ASSM
         LIST
$FORT
      END
```

VI. REFERENCES

1. Luers, James K., "A Method of Computing Winds, Density, Temperature, Pressure, and Their Associated Errors from the High Altitude ROBIN Sphere Using an Optimum Filter," Final Report AFCRL-70-0366 prepared for Air Force Cambridge Research Laboratories, Office of Aerospace Research, United States Air Force, Bedford, Massachusetts, July 1970.

2. Engler, Nicholas A., James K. Luers, "Modification to the 1972 ROBIN Program, ASL-CR-78-008-1, July 1978, U. S. Army Electronics Research and Development Command, Atmospheric Sciences Laboratory, White Sands Missile Range, New Mexico 88002.